SCIENTIFIC AMERICAN

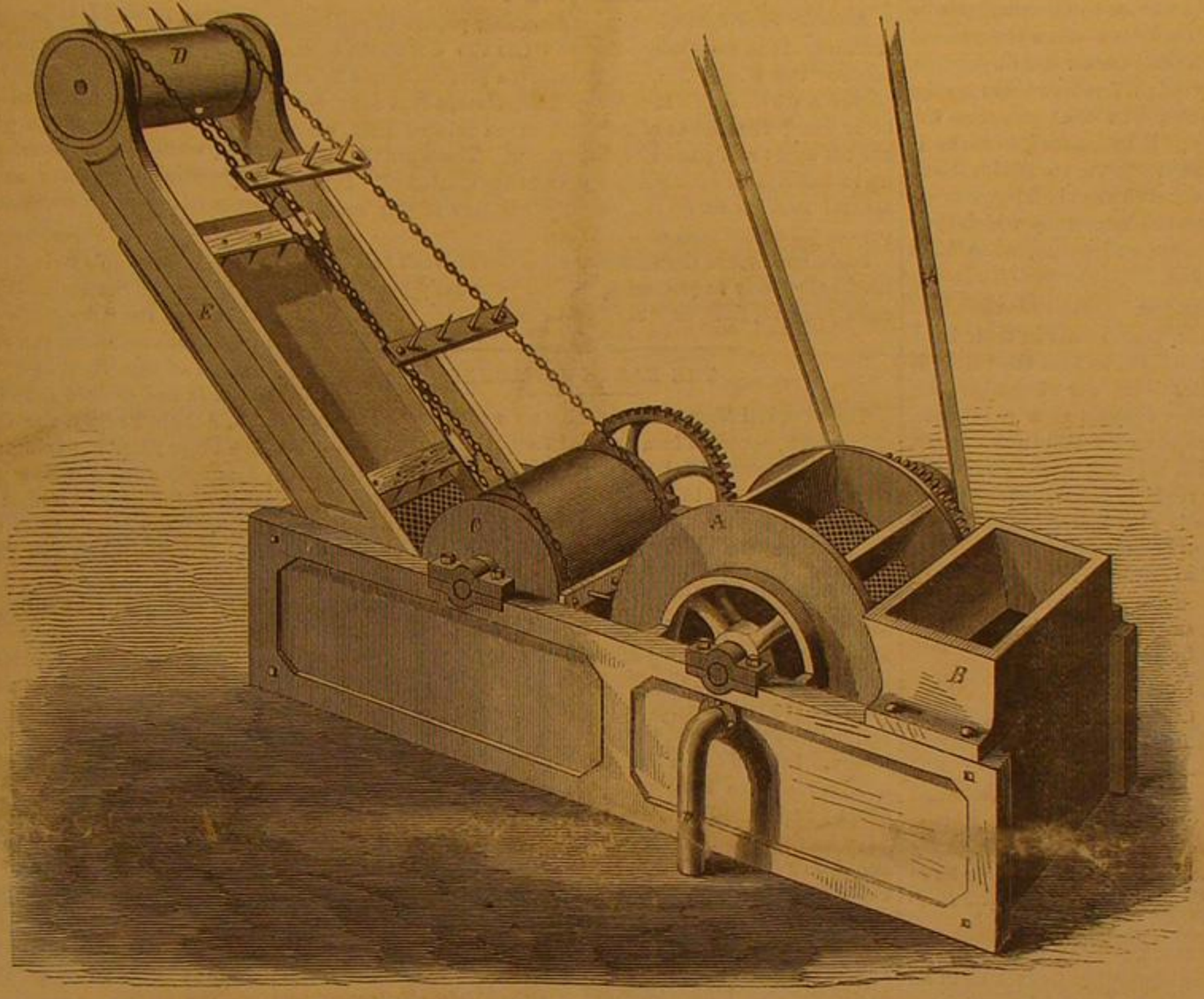
A WEEKLY JOURNAL OF PRACTICAL INFORMATION, ART, SCIENCE, MECHANICS, CHEMISTRY, AND MANUFACTURES

Vol. XIX.---No. 17. [NEW SERIES.] NEW YORK, OCTOBER 21, 1868. $3 per Annum. [IN ADVANCE.]

Improved Machine for Washing Paper Stock.

The object of the invention which is illustrated in the accompanying engraving is to furnish an improved washer for cleansing paper stock, so that after being washed the foul water shall not again come in contact with the stock, but be discharged.

The engraving represents an ordinary tank furnished with an agitating wheel, A, provided with floats, beneath which is a gauze wire cylinder forming a portion of the wheel. This wheel is driven by any power, a belt and pulley being shown in the engraving. In front of the wheel is a hopper, B, into which the rags or other description of stock, or the pulp is fed, the stock being delivered to the lower surface of the wheel, which is immersed in water about one third of its diameter. In the rear of the bucket wheel is a cylinder, C, connected with another, D, at the top of the fixed incline, E, by means of two chains, carrying a series of toothed bars or rakes for lifting the washed stock and delivering it at any required hight, or in an upper story of the building. The lower cylinder is connected to and driven by the agitating wheel by means of gearing adjusted to run the elevator at the proper speed. To cause the wet stock to be readily discharged from the rake teeth, the ways or guides on which the ends of the rake bars slide are so arranged that the rakes are forced inward from a straight line, so that when they pass beyond the upper ends of the ways they spring outward, or downward, with force sufficient to discharge the stock. The screen at the foot of the inclined chute is designed to separate kernels, gravel, or any foreign matter from the stock. If pulp is washed the rakes may be provided with screens of wire netting to retain it while it is being delivered.



ANDREWS' PAPER STOCK WASHING MACHINE.

One end of the agitating wheel is provided with a projecting hub or flange, of a diameter not exceeding that of the gauze cylinder forming the body of the wheel. The edge of this hub fits closely to a semicircular projection on the inside of the tank, and the two form a passage with the pipe, F, for discharging the foul water from the interior of gauze cylinder while preventing the wasting of any of the stock or pulp. The design, construction, operation, and advantages of the machine can be understood by the foregoing description and illustration.

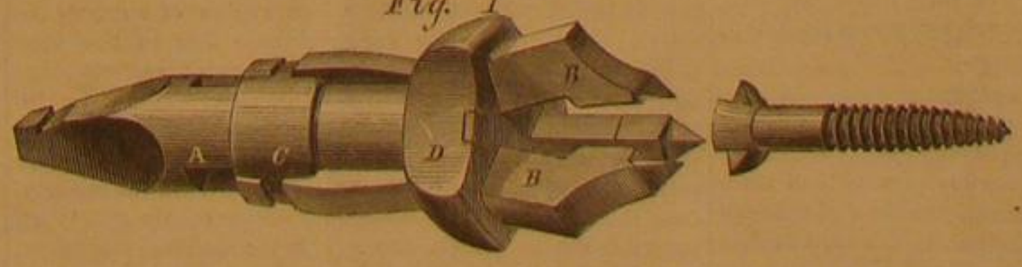
Patented through the Scientific American Patent Agency, July 14, 1868, by J. E. Andrews, whom address for additional particulars, at Coeyman's Hollow, Albany Co., N. Y.

Improved Wood Screw and Driver.

The slotted head of the common wood screw is frequently split when much force is required to seat it or to remove it, and every mechanic has been annoyed by the slipping off of the screw driver blade from the head of the screw. To provide a remedy for these objections is the object of the inventor of the screw and driver shown in the accompanying engravings. The screw head has three V-shaped notches cut equidistant in the edge, instead of the single cross slot. The screw driver, seen in perspective in Fig 1, has three corresponding jaws which by a simple arrangement automatically open and close upon the screw head.

Fig. 2

Fig. 1



JACOBUS' PATENT WOOD SCREW AND SCREW DRIVER.

The stock, A, is intended to fit into a bit-stock, and is hollow for the larger part of its length, and has three longitudinal slots in which slide the jaws, B, all moved simultaneously by a sliding ring, C, with which they engage. They are opened and closed by means of the incline of their forward portion sliding through corresponding apertures in the collar end of the implement, designated by D in Fig. 1.

When held in an upright position, the jaws down, the combined weight of jaws, and ring cause them to fall, and the points of the jaws open sufficiently to receive the head of an ordinary screw. Now if pressure is exerted the stock is forced down and the jaws compressed, griping the screw-head with an energy proportioned to the forced exerted; the harder the pressure the greater the tenacity of the grip. The edges of the jaw points, when they are seated on the screw head, project sufficiently to cut a countersink to seat the head, preventing the necessity of using a separate tool for this purpose. In fact, unless in very hard wood, there will be no necessity of previously boring a hole to receive the screw. When the screw is nearly home the driver may be raised and the head driven to its seat. In removing a screw this driver is equally effective. One advantage of this device may not be apparent at first sight; that is the absolute connection between the screw and driver which will enable the workman to drive the screw into wood at any angle, perfectly governing its direction. The increased strength of the screw head from this style of construction, the certainty of grip on the screw, and the entire control over the course of the screw appear to us to highly recommend this device.

Improved form of screw patented Aug. 4, 1868, and driver, 18th of the same month, same year, both through Scientific American Patent Agency. Address P. N. Jacobus, M D., Flatbrookville, N. J. See "Business and Personal" in this issue.

Manner of Using Steel in the St. Louis Bridge.

In the report of the Engineer-in-chief, Mr. James B. Eads, the method of using steel in bridge construction is thus referred to:

"To obtain the highest value of cast steel in compression, with the greatest economy in construction, I think it should be used in the tubular form. Although cast-steel tubes have been recently drawn cold by hydrostatic pressure in France, from steel expressly prepared for the purpose, I cannot learn that the process has been carried to any extent beyond the production of gun barrels. It is quite possible that this method may in the future furnish steel much superior for bridging to anything we can now obtain. I have but little doubt that methods of manufacturing and tempering steel in this form, for bridge construction, will soon be discovered, by which a much higher value of strength may be safely used in construction. As the use of cast steel in bridge building is comparatively in its infancy, I have deemed it proper to use the material at a much safer limit as regards its ultimate strength than my judgment would otherwise dictate. I feel assured that the structure would be entirely safe to bear a far greater load than can be placed upon it, if its arches contained but one half of the steel that will form them. When this material comes to be universally used in bridge construction in the place of wrought and cast iron, as it inevitably will be, because of its greater economy, the very large margin for safety provided by the liberal use of this material in your bridge will be more fully appreciated.

"To insure a uniform quality and high grade of steel at the lowest prices, and at the same time avail myself of the advantages of the tubular form of construction, I propose to have the steel rolled for the arches in bars of 9 feet length and of such form than 10 of them shall fill the circumference of a 9-inch lap-welded tube about ½-inch thick, in the manner that the staves of a barrel fill the hoops. This would virtually from a steel tube 9 inches in diameter and of 6 inches bore, the steel being about 1½ inches thick, and would be much less expensive than if the tube were rolled or drawn in one piece. The manufacture of steel in such small bars will insure a more uniform quality in the metal, and in the tube each bar will be supported against deflection in every direction.

"The tubes will be retained in their positions by an effective system of bracing, which will sustain the *voussoirs*, or pieces against which the tubes are butted throughout the arch. The upper and lower members of each arch will each be formed of two courses of these tubes, from end to end of the arch, each tube having a sectional area of 36 square inches at the summit of the arch. As each span would be made up of four arches, and each arch of four of these tubes, the span would have an aggregate sectional area at that part of 576 cubic inches of steel. The tubes, for about 20 feet of their lengths nearest the abutments, would require one-half more sectional area to resist the greater strains at those points. The tubing in which the steel bars would be inclosed would effectually protect the latter from the weather. I am gratified in being able to state that proposals from several of our leading steel makers in the United States have been received, and also from the most celebrated in Europe, among whom I may name Vickers & Co., of England; Petin Gaudet & Co., of France; and Fried. Krupp, of Prussia; all offering to furnish the steel and agreeing to guarantee its strength fully up to the standard required. The importance of being guided by the very best lights that can be obtained from practical and careful experiment, and the great interests involved in the safety and permanency of the structure, fully convinced me, at the inception of this enterprise, of the necessity of instituting a careful series of experimental tests of the materials to be used, and also determined me to have every part of the structure thoroughly tested to a degree of strain much beyond what it can by any possibility be subjected to when in the bridge. For this purpose I am having a powerful machine made, that will be capable of carefully testing every member used in its construction."

Tools rust out from neglect; wear out from use. Neglect is criminal; use is beneficial. So with man's capabilities; better wear out than rust out.

HOW NEWSPAPERS ARE MADE.

In our last issue we published from the *Evening Mail* some interesting details concerning the machinery employed in the production of newspapers. We continue the subject from the same journal. The last article left the types on the "galleys."

Our matter has been set up, justified, proved, and revised, so that we are now ready to make it up in columns. Ordinary job work is set up on a flat bed, inclosed in an iron frame called a "chase," and locked up by means of wooden wedges, but all newspapers of considerable circulation use the type-revolving press, and the matter is made up, therefore, entirely on "turtles."

"MAKING UP."

These are very heavy, and each, therefore, has a wooden stand of his own, about waist high, which may easily be rolled from place to place. The column rules—that is, the lines between the columns of the paper—are each all in one piece and permanently attached to the turtle, so that type can easily be slid up and down the column. Daily papers require one workman to keep the run of the advertisements alone, and insert or omit them on the proper days according to the arrangements of the publication office. The advertisements, then, are placed in their proper columns in the turtles—the matter being transferred in small portions—then the general matter, room being reserved for the late matter and dispatches. These set up and proved, in they go; a foreman locks up the type with a wrench, which drives screws that compress the columns from the bottom, the type is hammered, to make it even, with a block and mallet, and the forms are ready. Each page requires one turtle. They are awkward looking, curved arrangements, with projections on the bottom by which they are fastened on to the press cylinder, and weigh, when filled with type, nearly a quarter of a tun.

THE PRESS-ROOM.

Nearly all the dailies have their press-rooms in their basements and their compositors in the attic, so that the turtle is whizzed down the "dumb-waiter"—as our housekeeping friends would say—into the nether regions at a great rate. Here it is received on another stand and rolled to the press, over which is a sliding beam with hoisting apparatus to get the turtle upon the press. This requires the strength of two or three men, who hoist it, slide it along, and lower it carefully upon the cylinder, which has been stopped just so as to receive the turtle at the top. The creak of the hoisting calls the pressmen to their machine, one man to feed each paper cylinder—from two to ten in number—and several to stack the papers thrown off by the flyers of the press.

"STARTING UP."

The turtles fastened on, the nearest pressman turns the lever and off goes the press, piling up the papers at the rate of a couple of thousand copies an hour for each cylinder. The *Mail* press is a four-cylinder and rattles off its eight thousand an hour at a great rate. The *World* has a ten-cylinder press, the largest size made. In these a labyrinth of stairways are required to reach the various parts, and the room must be at least twenty feet high. Two eight-cylinders supply the readers of the *Tribune*. The *Herald* has five Hoe presses.

THE NEWSBOYS.

One of the important adjuncts and chief botherations of an evening paper are the newsboys—including girls—who congregate in the part of the press-room allotted to them, and do their best to overflow to where they may get at the press and the machinery. They sell morning papers from six to ten, Grecian Bends during the middle of the day, evening papers in the afternoon, and, as a general thing, go to the New Bowery in the evening. *Ad interim*, they lay off on the press-room steps, tell stories, and fight, the girls being, as a general thing, better than the boys at the latter.

A PRESS CURIOSITY.

One of the curiosities of Printing House Square is the huge engine which runs the *Mail* press, as well as many others. This is owned by a firm in Spruce street between William and Nassau, and occupies the basement of their building. There is a large 150 horse-power engine which runs during the day, and a 75 horse-power which relieves it at night. From this shafting and belting distribute the power in every direction. One shaft runs to and across Frankfort street, supplying the *Mail* and other offices, another crosses William street and runs the six cylinder presses which pile the 300,000 copies of the *Ledger* in its beautiful press room. Another shaft crosses Spruce street, runs through and across Beekman, and even supplies presses in Ann street.

ITS SHAFTS AND BELTING.

Altogether these engines supply over 125 presses—each being estimated and charged so much per horse-power according to this estimate. It runs three-quarters of a mile of main shafting, beside a mile or more connecting shafts and as much belting. One of these belts, an india-rubber one, 120 feet long, connects a fifth story press on Nassau street with the main shafting on Spruce across the intervening yards, and another leather one on Beekman street street, 140 feet long, perfectly perpendicular, connects the sub cellar and attic.

WHAT IT DOES.

This engine prints all McLaughlin's toy books, runs the immense establishments of Bradstreet and J. W. Oliver, beside many other job printers, and a hoop-skirt manufactory and several binderies, and prints nearly fifty papers, beside magazines and books innumerable, among them, beside the *Mail*, the *Independent, Dispatch, Leader, Star, Examiner and Chronicle, Observer, Courier, Clipper, Wilkes' Spirit, Turf, Field, and Farm, Police Gazette, La Crosse Democrat, Ledger, New York Weekly, Literary Album, Sunday Times, New Yorker Democrat, Commonwealth, Scottish American, Freeman's Journal, Tablet, Emerald, Irish American, Irish People*, etc., etc. Truly a power in the world.

FOLDING THE PAPERS.

Most of the quarto dailies have folding machines in their press-rooms, which fold a pile of papers with incredible rapidity. The weeklies are mostly folded by hand, the workmen attaining a wonderful expertness. Nearly a dozen men are occupied, however, with all their quickness, in folding and mailing the weekly issue of the *Independent*.

ABOUT PAPER.

One of the most important items in the cost of a paper is the paper itself. Some of the statistics of the *Tribune*, the largest sized paper published, will show its extent. Its paper weighs 65 pounds per ream (240 sheets), and measures 37 by 47½ inches. One issue of the 240,000 copies of the *Weekly Tribune* weighs 31,200 pounds, over fifteen tuns. This makes a column three feet by two at the base, and one hundred and forty feet high. The paper used by the *Tribune* establishment during the year is about fifteen hundred tuns, costing over $300,000, which, if piled, would make a monument of solid intelligence one mile high and four feet square. Something like twenty-five million sheets pass their presses every year.

MAILING PAPERS.

Another considerable item is directing papers to mail subscribers. It is calculated that to write the directions of one issue of the *Weekly Tribune*, sixty-seven persons would be employed a whole day. Most papers, therefore, adopt the system of keeping the names of subscribers on printed lists, which are cut apart and pasted on the papers. These are then made up in bundles for each postoffice, and thus started off. It takes several cars to carry the weekly editions of our morning papers which are sent to the West.

Such, reader, are the immense agencies at work in a merely mechanical way in producing for you your daily paper, which costs you five, four, or "only two cents."

THE EARTH A MAGNET.

The Cornhill Magazine contains an article with the above title which, contains in a popular form, the facts and theories in regard to terrestrial magnetism, a condensation of which will be of interest to our readers.

"The peculiarity that the magnetic needle does not, in general, point to the north, is the first of a series of peculiarities which we now propose briefly to describe. The irregularity is called by sailors the needle's variation, but the term more commonly used by scientific men is the declination of the needle. It was probably discovered a long time ago, for 800 years before our era the Chinese applied the magnet's directive force to guide them in journeying over the great Asiatic plains; and they must soon have detected so marked a peculiarity. Instead of a ship's compass they made use of a magnetic car, on the front of which a floating needle carried a small figure whose outstretched arm pointed southward. We have no record, however, of their discovery of the declination, and know only that they were acquainted with it in the twelfth century. The declination was discovered, independently, by European observers in the thirteenth century.

"As we travel from place to place the declination of the needle is found to vary; Christopher Columbus was the first to detect this. He discovered it on the 13th of September, 1492, during his first voyage, and when he was six hundred miles from Ferro, the most westerly of the Canary Islands. He found that the declination, which was toward the east in Europe, passed to the west, and increased continually as he traveled westward.

"But here we see the first trace of a yet more singular peculiarity. We have said that at present the declination is toward the west in Europe. In Columbus' time it was toward the east. Thus we learn that the declination varies with the progress of time, as well as with change of place.

"We find first, that the world may be divided into two unequal portions, over one of which the needle has a westerly, and over the other an easterly, declination. Along the boundery line, of course, the needle points due north. England is situated in the region of westerly magnets. This region includes all Europe, except the north-eastern parts of Russia; Turkey, Arabia, and the whole of Africa; the greater part of the Indian Ocean, and the western parts of Australia; nearly the whole of the Atlantic Ocean; Greenland, the eastern parts of Canada, and a small slice, from the north-eastern part of Brazil. All these form one region of westerly declination; but singularly enough, there lies in the very heart of the remaining and larger region of easterly magnets, an oval space of a contrary character. This space includes the Japanese Islands, Manchouria, and the eastern parts of China. It is very noteworthy also, that in the westerly region the declination is much greater than the easterly. Over the whole of Asia, for instance, the needle points almost due north. On the contrary, in the north of Greenland and of Baffin's Bay, the magnetic needle points due west, while still further to the north (a little westerly) we find the needle pointing with its north end directly toward the south.

"In the fifteenth century there was an easterly declination. This gradually diminished, so that in about the year 1657 the needle pointed due north. After this the needle pointed toward the west, and continually more and more, so that scientific men, having had experience only of a continual shifting of the needle in one direction, began to form the opinion that this change would continue, so that the needle would pass, through north-west and west, to the south. In fact, it was imagined that the motion of the needle would resemble that of the hands of a watch, only in a reversed direction. But before long observant men detected a gradual diminution in the needle's westerly motion. Arago, the distinguished French astronomer and physicist, was the first (we believe) to point out that 'the progressive movement of the magnetic needle toward the west appeared to have become continually slower of late years' (he wrote in 1814), 'which seemed to indicate that after some little time longer it might become retrograde.' Three years later, namely on the 10th of February, 1817, Arago asserted definitively that the retrograde movement of the magnetic needle had commenced to be perceptible. It appears from a careful comparison of Beaufoy's observations that the needle reached the limit of its western digression (at Greenwich) in March, 1819, at which time the declination was very nearly 25°. In Paris, on the contrary, the needle had reached its greatest western digression (about 22½°) in 1814. It is rather singular that although at Paris the retrograde motion thus presented itself five years earlier than in London, the needle pointed due north at Paris six years later than in London, viz. in 1663. Perhaps the greater amplitude of the needle's London digression may explain this peculiarity.

"'It was already sufficiently difficult,' says Arago, 'to imagine what could be the kind of change in the constitution of the globe, which could act during one hundred and fifty-three years, in gradually transferring the direction of the magnetic needle from due north to 23° west of north. We see that it is now necessary to explain, moreover, how it has happened that this gradual change has ceased, and has given place to a return toward the preceding state of the globe.' 'How is it,' he pertinently asks, that the directive action of molecules of which the globe is composed, can be thus variable, while the number, position, and temperature of these molecules, and, as far as we knew, all their other physical properties remain constant?'

"But we have considered only a single region of the earth's surface. Arago's opinion will seem still more just when we examine the change which has taken place in what we may term the the "magnetic aspect" of the whole globe. The line which separates the region of westerly magnets from the region of easterly magnets, now runs, as we have said, across Canada and eastern Brazil in one hemisphere, and across Russia, Asiatic Turkey, the Indian Ocean, and West Australia in the other; beside having an outlying oval to the east of the Asiatic Continent. Now these lines have swept around a part of the globe's circuit in a most singular manner since 1600. They have varied alike in direction and complexity. The Siberian oval, now distinct, was, in 1787, merely a loop of the eastern line of no declination. The oval appears now to be continually diminishing, and will one day probably disappear.

"We find here presented to us a phenomenon as mysterious, as astonishing, and as worthy of careful study as any embraced in the wide domains of science. But other peculiarities await our notice. If a magnetic needle of suitable length be carefully poised on a fine point, or, better, be suspended from a silk thread without torsion, it will be found to exhibit each day two small but clearly perceptible oscillations. M. Arago, from a careful series of observations, deduced the following results:

"At about eleven at night, the north end of the needle begins to move from west to east, and having reached its greatest easterly excursion at about a quarter past eight in the morning, returns toward the west to attain its greatest westerly excursion at a quarter past one. It then moves again to the east, and having reached its greatest easterly excursion at half past eight in the evening, returns to the west, and attains its greatest westerly excursion at eleven, as at starting.

"Of course, these excursions take place on either side of the mean position of the needle, and as the excursions are small never exceeding the fifth part of a degree, while the mean position of the needle lies some 20° to the west of north, it is clear that the excursions are only nominally eastern and western, the needle pointing throughout, far to the west.

"Now if we remember that the north end of the needle is that furthest from the sun, it will be easy to trace in M. Arago's results a sort of effort on the part of the needle to turn toward the sun—not merely when that luminary is above the horizon, but during his nocturnal path also. We are prepared, therefore, to expect that a variation having an annual period shall appear, on a close observation of our suspended needle. Such a variation has been long since recognized. It is found that in the summer of both hemispheres, the daily variation is exaggerated, while in winter it is diminished.

"But beside the divergence of a magnetized needle from the north pole, there is a divergence from the horizontal position, which must now claim our attention. If a non-magnetic needle be carefully suspended so as to rest horizontally, and be then magnetized, it will be found no longer to preserve that position. The northern end dips very sensibly. This happens in our hemisphere. In the southern it is the southern end which dips. It is clear, therefore, that if we travel from one hemisphere to the other we must find the northern dip of the needle gradually diminishing until at some point near the equator the needle is horizontal, and as we pass thence to southern regions a gradually increasing southern inclination is presented. This has been found to be the case, and the position of the line along which there is no inclination (called the magnetic equator) has been traced around the globe. It is not coincident with the earth's equator, but crosses that circle at an angle of twelve degrees, passing from north to south of the equator in long. 3° west of Greenwich, and from south to north in long. 187° east of Greenwich. The form of the line is not exactly that of a great circle, but presents here and there (and especially where it crosses the Atlantic) perceptible excursions from such a figure.

"At two points on the earth's globe the needle will rest in a

vertical position. These are the magnetic poles of the earth. The northern magnetic pole was reached by Sir J. G. Ross, and lies in 70° N. lat. and 263° E. long., that is, to the north of the American continent, and not very far from Boothia Gulf. One of the objects with which Ross set out on his celebrated expedition to the Antarctic Seas was the discovery if possible of the southern magnetic pole. In this he was not successful. Twice he was in hopes of attaining his object, but each time he was stopped by a barrier of land. He approached so near, however, to the pole, that the needle was inclined at an angle of nearly ninety degrees to the horizon, and he was able to assign to the southern pole a position in 75° S. lat., 154° E. long. It is not probable, we should imagine, that either pole is fixed, since we shall now see that the inclination, like the declination of the magnetic needle, is variable from time to time, as well as from place to place; and, in particular, the magnetic equator is apparently subjected to a slow but uniform process of change.

"Arago tells us that the inclination of the needle at Paris has been observed to diminish year by year since 1671. At that time the inclination was no less than 75°; in other words, the needle was inclined only 15° to the vertical. In 1791 the inclination was less than 71°. In 1831 it was less than 68°. In like manner the inclination at London has been observed to diminish, from 72° in 1786 to 70° in 1804, and thence to 68° at the present time.

"It might be anticipated from such changes as these, that the position of the magnetic equator would be found to be changing. Nay, we can even guess in which way it must be changing. For, since the inclination is diminishing at London and Paris, the magnetic equator must be approaching these places, and this (in the present position of the curve) can only happen by a gradual shifting of the magnetic equator from east to west along the true equator. This motion has been found to be really taking place. It is supposed that the movement is accompanied by a change of form; but more observations are necessary to establish this interesting point.

"Can it be doubted that while these changes are taking place, the magnetic poles are slowly shifting round the true pole? Must not the northern pole, for instance, be further from Paris now that the needle is inclined more than 23° from the vertical than in 1671, when the inclination was only 15°. It appears obvious that this must be so, and we deduce the interesting conclusion that each of the magnetic poles is rotating around the earth's axis.

"But there is another peculiarity about the needle which is as noteworthy as any of those we have spoken about. We refer to the intensity of the magnetic action, the energy with which the needle seeks its position of rest. This is not only variable from place to place, but from time to time, and is further subject to sudden changes of a very singular character.

"It might be expected that where the dip is greater, the directive energy of the magnet would be proportionably great. And this is found to be approximately the case. Accordingly the magnetic equator is very nearly coincident with the 'equator of least intensity,' but not exactly. As we approach the magnetic poles we find a more considerable divergence, so that instead of there being a northern pole of greatest intensity nearly coincident with the northern magnetic pole, which we have seen lies to the north of the American continent, there are *two* northern poles—one in Siberia nearly at the point where the river Lena crosses the Arctic circle, the other not so far to the north—only a few degrees north, in fact, of Lake Superior. In the south, in like manner, there are also two poles—one on the Antartic circle, about 130° E. long., in Adelie Island, the other not yet precisely determined, but supposed to lie on about the 240th degree of longitude, and south of the Antartic circle. Singularly enough there is a line of lower intensity running right round the earth along the valleys of the two great oceans, 'passing through Behring's Straits, and bisecting the Pacific on one side of the globe, and passing out of the Arctic Sea by Spitzbergen and down the Atlantic on the other.'

"Colonel Sabine discovered that the intensity of the magnetic action varies during the course of the year. It is greatest in December and January *in both hemispheres*. If the intensity had been greatest in winter one would have been disposed to have assigned seasonal variation of temperature as the cause of the change. But as the epoch is the same for both hemispheres we must seek another cause. Is there any astronomical element which seems to correspond with the law discovered by Sabine? There is one very important element. The position of the perihelion of the earth's orbit is such that the earth is nearest to the sun on about the 31st of December or the 1st of January. There seems nothing rashly speculative, then, in concluding that the sun exercises a magnetic influence on the earth, varying according to the distance from the sun. Nay, Sabine's results seem to point very distinctly to the law of variation. For, although the number of observations is not as yet very great, and the extreme delicacy of the variation renders the determination of its amount very difficult, enough has been done to show that in all probability the sun's influence varies according to the same law as gravity—that is, inversely as the square of the distance.

"That the sun, the source of light and heat, and the great gravitating centre of the solar system, should exercise a magnetic influence upon the earth, and that this influence should vary according to the same law as gravity, or as the distribution of light and heat, will not appear perhaps very surprising. But the discovery by Sabine that *the moon* exercises a distinctly traceable effect upon the magnetic needle seems to us a very remarkable one. We receive very little light from the moon, much less (in comparison with the sun's light) than most persons would suppose, and we get absolutely no perceptible heat from her. Therefore it would seem rather to the influence of mass and proximity that the magnetic disturbances caused by the moon must be ascribed. But if the moon exercises an influence in this why, why should not the planets? We shall see that there is evidence of some such influence being exerted by these bodies.

"More mysterious if possible than any of the facts we have discussed is the phenomenon of *magnetic storms*. The needle has been exhibiting for several weeks the most perfect uniformity of oscillation. Day after day the careful microscopic observation of the needle's progress has revealed a steady swaying to and fro, such as may be seen in the masts of a stately ship at anchor on the scarce-heaving breast of ocean. Suddenly a change is noted; irregular jerking movements are perceptible, totally distinct from the regular periodic oscillations. A magnetic storm is in progress. But where is the centre of disturbance, and what are the limits of the storm? The answer is remarkable. If the jerking movements observed in places spread over very large regions of the earth—and in some well-authenticated cases over the whole earth—be compared with the local time, it is found that (allowance being made for difference of longitude) *they occur precisely at the same instant*. The magnetic vibrations thrill in one moment through the whole frame of our earth.

But a very singular circumstance is observed to characterize these magnetic storms. They are nearly always observed to be accompanied by the exhibition of the aurora in high latitudes, northern and southern. Probably they never happen without such a display; but numbers of auroras escape our notice. The converse proposition, however, *has* been established as universal one. No great display of the aurora ever occurs without a strongly marked magnetic storm.

"Magnetic storms sometimes last for several hours or even days.

"Remembering the influence which the sun has been found to exercise upon the magnetic needle, the question will naturally arise, has the sun anything to do with magnetic storms? We have clear evidence that he has.

"On the 1st of September, 1859, Messrs. Carrington and Hodgson were observing the sun, one at Oxford and the other in London. Their scrutiny was directed to certain large spots which, at that time, marked the sun's face. Suddenly, a bright light was seen by each observer to break out on the sun's surface, and to travel, slowly in appearance, but in reality at the rate of about 7,000 miles in a minute, across a part of the solar disk. Now it was found afterward that the self-registering magnetic instruments at Kew had made at that very instant a strongly marked jerk. It was learned that at that moment a magnetic storm prevailed at the West Indies, in South America, and in Australia. The signalmen in the telegraph stations at Washington and Philadelphia received strong electric shocks; the pen of Bain's telegraph was followed by a flame of fire; and in Norway the telegraphic machinery was set on fire. At night great auroras were seen in both hemispheres. It is impossible not to connect these startling magnetic indications with the remarkable appearance observed upon the sun's disk.

"But there is other evidence. Magnetic storms prevail more commonly in some years than in others. In those years in which they prevail most frequently, it is found that the ordinary oscillations of the magnetic needle are more extensive than usual. Now when these peculiarities had been noticed for many years, it was found that there was an alternate and systematic increase and diminution in the intensity of magnetic action, and that the period of the variation was about eleven years. But at the same time a diligent observer had been recording the appearance of the sun's face from day to day and from year to year. He had found that the solar spots are in some years more freely displayed than in others. And he had determined the period in which the spots are successively presented with maximum frequency to be about 11 years. On a comparison of the two sets of observations, it was found (and has now been placed beyond a doubt by many years of continued observation) that magnetic perturbations are most energetic when the sun is most spotted, and *vice versa*.

"For so remarkable a phenomenon as this none but a cosmical cause can suffice. We can neither say that the spots cause the magnetic storms nor that the magnetic storms cause the spots. We must seek for a cause producing at once both sets of phenomena. There is as yet no certainty in this matter, but it seems as if philosophers would soon be able to trace in the disturbing action of the planets upon the solar atmosphere the cause as well of the marked period of eleven years as of other less distinctly marked periods which a diligent observation of solar phenomena is beginning to educe."

ARTIFICIAL STONE—THE PROCESS OF ITS MANUFACTURE.

This remarkable and important manufacture is at last not only well established on chemical principles, but carried out on a large commercial scale. Nearly a quarter of a century has elapsed since Mr. Ransome, of London, commenced his experiments in this direction. Like all pioneers in similar enterprises, he encountered grave and repeated difficulties—not more, however, from the intractability of materials than public unbelief. It was not until 1861 that he discovered the complete and certain process now employed, and to-day, builders at large are but beginning to recognize the proofs of the new material, and to admit its superiority. For years the concrete stone has been subjected to every test that ingenuity could devise—to heat and frost—to water, fresh, salt, and impure, to wash and attrition, and to every atmospheric exposure. Very few natural stones are as durable or as uniform, and the best of them are costly, and, in many localities, inaccessible.

But the comparative cheapness and durability of the artificial stone are of no greater importance to architecture as an engineering art than to architecture as a fine art. The enormous expense of cutting shapeless rocks into the exact and elaborate forms of beauty, prevents the general adornment of structures. But when the beautiful form may not only be *cast in a mold*, but endlessly reproduced from the same mold as easily as the ugly form; and when the most florid ornamentation may be more cheaply molded than the plainest and most unrelieved outlines can be cut, there will be no further excuse for the monotonous, ugly, or cheap looking buildings that characterize street architecture, especially among the Anglo-Saxon peoples.

Those who have occasion to study in detail, or to practice the new art, should read the various illustrated and technical articles upon it in the London *Engineering*. The general features of the process are as follows: We quote from the New York *Times*, which presents a resumè of the subject, the points being taken from English exchanges, and presented in as brief and clear a form as we could hope to do:

"Mr. Ransome's patent concrete stone consists of sand united, not by any mechanical sticking compound, but by chemicals which transform it into a new and homogeneous mass. It is particles of sand, in some cases mixed with a little limestone, united by silicate of lime. The manner of forming this silicate of lime in the mass is, in fact, the essence of the invention. The sand is mixed with a viscid solution of silicate of soda, which produces a pasty mass, readily molded. When the required forms are produced they are treated with a solution of chloride of calcium, when the silicic acid and the oxygen of the silicate of soda combine with the calcium of the chloride of calcium and form silicate of lime, while the chlorine of the chloride of calcium unites with the sodium and forms chloride of sodium (common salt), which is afterward washed out. But Mr. Ransome had no sooner discovered *how* to provide for the chemical reactions than the commercial problem of cost of materials assumed very serious proportions. Silicate of soda, the chemical upon which the process hinges, was, indeed, produced by two modes, both of them, however, expensive, and neither of them adequate in degree. The solution was too weak to answer his purpose. The scientific importance and the practical difficulty of the improvement, therefore, lay—just as they did in the Bessemer and other processes—not in making the desired material, but in making a material with which to make it. Mr. Ransome's great invention was the production of silicate of soda under pressure. While powdered flintstone, boiled in a solution of caustic soda, at the atmospheric pressure for many hours, would yield but a weak and inadequate fluid, whole flints so boiled, under a pressure of sixty pounds, readily dissolved and formed a strong silicate of soda.

"The first process is drying the sand by letting it slide down through an inclined revolving cylinder, warmed by a blast of heated air. The sand is then sorted in bins, according to its fineness. The silicate of soda is prepared in a boiler resembling a cylindrical steam boiler. The flints are laid on a grating in the boiler, the caustic soda fills the boiler, and the heating is done by steam pipes introduced into it from a steam boiler. The solution thus obtained is further strengthened by evaporation in a tank furnished with steam heating pipes.

"The mixing of the dry sand and the sticky, liquid silicate of soda, is done by a kneading mill consisting of iron wheels, with projections, rolling in a trough. From two and one fourth to three bushels of the sand, or sand and limestone, are thoroughly mixed with one gallon of the solution (which has a density of 1.7), and the pasty mass thus formed has just enough cohesion to enable it to be molded. The molding consists simply of forcing the paste, a little at a time solidly into molds, which are then removed, leaving the perfectly shaped but fragile figure. The molds that are repeatedly used are made of iron.

"The next process is to change the molded mass, now weaker than plaster, and hardly stronger than putty, into stone; and this rapid and all important process exhibits a mechanical expedient not more remarkable than the chemical reaction. It had long been the custom to pour the petrifying liquid (chloride of calcium) over the figure, or when the latter was of suitable shape to be lifted, to immerse it in the liquid—the complete penetration in either case requiring a long time. The ingenious method now practiced is to connect a cavity left in the molded figure with an air pump, which, by exhausting the pores in the mass from within, allows the solution poured upon the exterior surfaces to be rapidly forced in and throughout the mass. In a few moments the stone is hardened, or rather created so that it can be handled with impunity. But to thoroughly expel the air, and to perfect the chemical action, the stone is further boiled in the solution of chloride of calcium (lime water) by means of tanks and steam pipes. These tanks are arranged in a row on one side of a railway, and on the other side there is a series of shower baths, by which the chloride of sodium formed in the stone is washed out. Drying now completes the process, and this is effected in the open air in summer, and in warm rooms in the winter.

"The sharpness of outline and the beauty of the finish are all that could be desired. In this regard it differs radically from sanded wood, stucco, and painted iron, which, when intended to imitate stone, invariably look cheap. The concrete stone, however, is not an imitation. Its color is also excellent, and may be considerably varied.

"The Patent Concrete Stone Works, where these operations are carried out on a very extensive scale, are situated on the Thames, at East Greenwich, below London."

Strength of material is not incompatible with grace of form. The artistical mechanic combines both.

SHAW'S LOCK WASHER.

In all the immense detail of railroads there is nothing more numerous than bolts and nuts, the object of which is to unite the many parts of the cars together and to secure the numerous joints of rails, which object the bolt only temporarily fulfills, as there is a great tendency to divorce, or separation between the bolt and nut consequent upon continual jars.

The constant concussion of a running train upon the rails and the many parts of the cars, causes the nuts and bolts to become loose, and frequently to fly off when applied in the ordinary way. The vexation to railroad men from this cause is great, and has induced them to adopt various and extraordinary means to overcome the evil. The most common method is to employ two nuts on one bolt, which is so limited a security, that it is found necessary to rivet the bolt after the application of the two nuts on locomotive trucks, and many other places, which operation secures the nut from turning, but converts the bolt into a rivet, and ceases to have any advantage that belongs to a bolt, in time of repairs, etc., as the bolt must then be cut or otherwise destroyed. Another method is to employ perforated sheet iron with a ragged exterior, the many points of which are intended to be bent around and

against the sides of the nut, which offers a pointed exterior not very unlike saw teeth, favorable to tearing clothes and incompatible with wiping or painting, and necessitates a rebending back of the iron points every time the nut is to be turned, which repeated bending of the iron breaks it, making this method of very limited and uncertain utility. Other methods are to employ keys and rubber washers, the former of which is troublesome and expensive, and the latter is perishable and costly; and neither are sufficient remedies.

For these reasons, Thomas Shaw, of Philadelphia, invented a most simple and sufficient remedy, seen in the engraving. Mr. Shaw's method is to make a plain steel washer, cut through one side with shears, which makes it like one coil of a spiral. The edges on which the nut presses, are made sharp, and the spiral is in a direction that allows the nut to travel freely over it when being tightened, but the edge catches into the nut when turned back, sufficiently to prevent the nut turning by any jarring, but yielding to the force of the wrench, and two nuts are no longer necessary; thus furnishing at once a complete remedy, and a cheaper appliance, adapted to all bolts now in use; and they cannot be wrongly applied. They are substituted for the plain washer; and it does not matter which side is next to the nut.

Patented April 28, 1868. Address Messrs Furbush & Gage, office 118 Market st., Philadelphia, Pa., manufactory Camden, N J., manufacturers of this article for railroads and other purposes, from whom any further information can be had.

The Planet Mars.

It appears from the searching scrutiny of the spectroscope that the planet has an atmosphere, and that the atmosphere most probably resembles our own in general constitution. Combining this evidence with that which we already possess of the presence of water in its liquid, vaporous, and solid states upon the surface, and with the certainty that the red tint of parts of the planet is due to a real ruddiness of substance (corresponding to the tint of certain soils upon our own earth), we cannot but recognize the extreme probability that in all essential habitudes the planet Mars resembles our own earth. One circumstance may at first excite surprise, namely, the fact that in a planet so much further from the sun than our earth, there should exist so close a resemblance, as respects climatic relations. But if we consider the results of Tyndall's researches on the radiation of heat, and remember that a very moderate increase in the quantity of certain vapors in our atmosphere would suffice to render the climate of the earth intolerable through excess of heat (just as glass walls cause a hothouse to be as an oven long after the sun has set), we shall not fail to see that Mars may readily be compensated by a corresponding arrangement for his increased distance from the vivifying center of the solar system.

Photography.

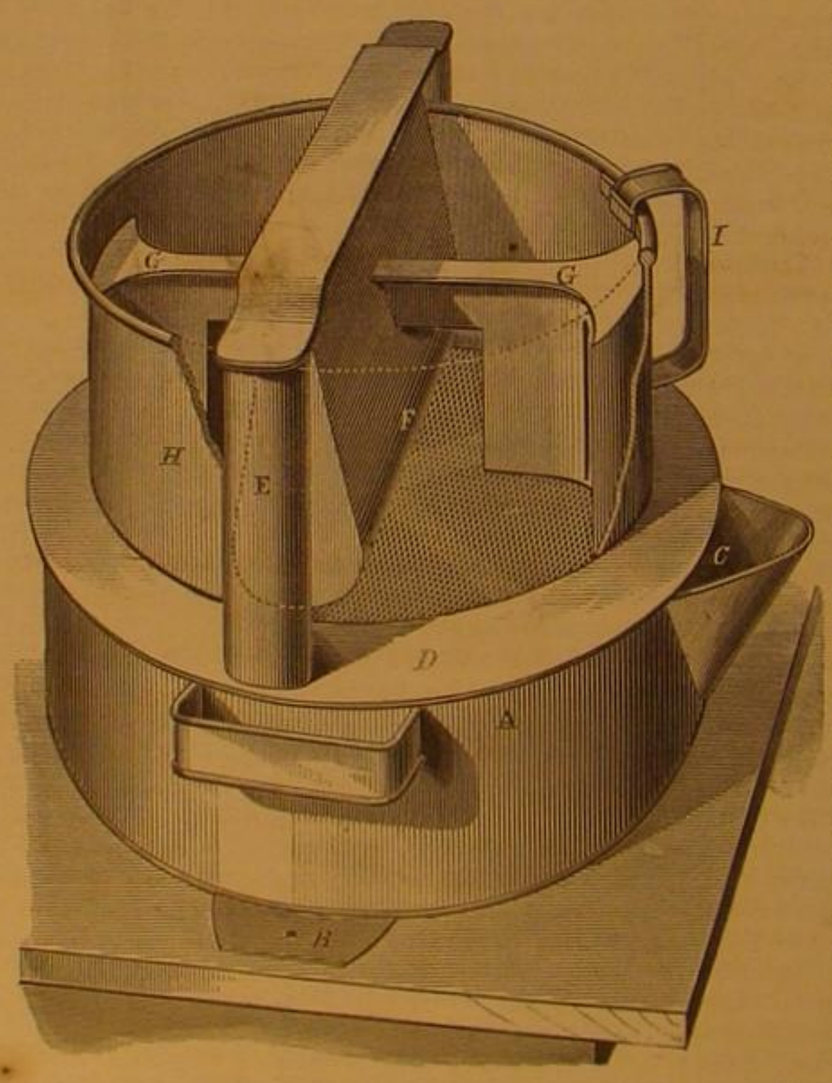
Producing Colored Pictures.—Various attempts have been made to obtain photographs of objects in their natural colors. These attempts have been so far successful as to produce photographs in which every color of the original was faithfully represented; even the iridescent colors of the peacock's feather have been beautifully photographed. It is, however, not yet quite certain whether any means have been discovered by which the colors can be permanently fixed, as hitherto they have slowly faded away, and become one uniform reddish tint. It is generally admitted that, up to the present time, the most successful photgrapher in producing colored pictures is M. Niepce de Saint Victor, whose process is this: He takes a daguerreotype, or silver coated plate, and dips it into a weak solution of hypochlorite of sodium, having a specific gravity of 1·35, until it has assumed a bright pinkish hue. The plate is then covered with a solution of dextrine, saturated with chloride of lead; it is then dried, and subsequently submitted to the action of heat for several hours until the temperature of the plate reaches from 95° to 100°, or else expose the plate to the rays of the sun as a substitute for artificial heat, under a sheet of paper which had been steeped in an acid solution of sulphate of quinine. The plate is then ready to be placed in the camera obscura, and to receive the colored picture of the spectrum, or any other object. It is said that he has succeeded in increasing the stability of the colors developed on the sensitive surface by covering the plate with an alcoholic solution of gum benzoin. This branch of photography has been called Heliochromie.

Decorations of Porcelain, Glass, etc.—A very important economic application of photography to the decoration of porcelain, glass, etc., with gold, silver, and other metals, consists in producing an ordinary silver image on a collodion film, and then, by toning processes, converting this image into any other metal which may be necessary. For a gold design the image is toned with chloride of gold; for a design the color of steel the image is toned with chloride of platinum; for a black metallic design the image is toned with chloride of iridium; for a brown design the image is toned with chloride of palladium. A design in a metal of one color can be obtained by first toning the image by the proper metallic salt, and then saturating the film with a solution of some other salt. The collodion film, treated in the manner indicated, is then transferred to the porcelain, and the salt reduced to the metallic state by heat.—*Humphrey's Journal.*

MRS. JONES' PATENT AUTOMATIC SIEVE.

In preparing pulp of squashes, apples, tomatoes, currants, etc., for pies, ketchups, jellies, or other housewifery manufactures, the material must usually be left to cool to such a degree as not to burn the hand when straining it through a sieve, cullender or coarse cloth. If this work could be done while the pulp is hot, much of the material now wasted might be saved. This is the object of the present invention.

The lower portion, A, is a pan of tin, secured to a table or bench by means of pins through ears, B, on either side. This holds the sifted material which may be poured out through the spout, C. Setting in the top of this pan is an annular flanged ring, D, having posts, E, on each side, with a cross piece supporting a presser, F, having a rounded bottom, and



two transverse arms, G, having concave heads intended to force the pulp in toward the presser and prevent it from adhering to the sides of the vessel, H. The bottom of this vessel is of wire gauze, as any sieve, and a projecting flange on it fits between that of the bottom vessel and a ring under the flange, D. This ring has two transverse bars extending across and serving to scrape the sifted pulp from the bottom of the seive. The upper vessel, H, containing the unsifted material, is partly rotated back and forth by the removable handle, I, the scrapers, G, conveying the material to the presser, F, the concave bottom of which, reaching nearly to the wire cloth, forces the pulp through. All the parts of the utensil may be separated easily for washing and drying.

This handy utensil was patented through the Scientific American Patent Agency, Aug. 11, 1868, by Mrs. J. D. Jones, who may be addressed relative thereto at 132 Newark avenue, Jersey City, N. J.

A French physician has found by experiment that when six drops of absinthe are placed in a quart of water, fishes will die more quickly when put in the mixture, than would be the case were the same amount of prussic acid contained in the water. The experiment only confirms the fact already well known that this drink is poisonous in common with all other strong stimulants. It may however have the effect to retard somewhat the growing use of absinthe in this country.

Chronometers.

Probably no mechanical operation involves greater nicety of work—except that of making the corsets of Eugenie or the moustache dye of Louis Napoleon—than the work involved in making and rating a strictly first class marine chronometer. Almighty Power has endowed the needle of the mariner's compass with the instinct of pointing to the north; but the navigator with compass alone could not trust himself with a valuable cargo upon uncertain waters, and successful navigation depends upon the accuracy of the chronometer.

There are in the entire United States but six makers of marine chronometers, and even these combine with the profession the making of chronometers for pocket use. Once made, a chronometer virtually lasts forever, and the demand for the article is so limited that, generally speaking, they must be ordered in advance of the necessity for their use. Of the six American makers of these delicate time-keepers, the oldest and confessedly the most experienced is a quiet gentleman, a devotee of astronomical science—literally a star-gazer—whose place of business is at No. 407 Chestnut street. Upon the roof of his building Mr. Harpur has constructed an observatory, in which each day he takes and registers the astronomical and mean time—a great deal more for his own satisfaction than for pecuniary return.

It is a privilege to ascend with him to the summit of those four stories, and watch him with quadrant, sextant, and other scientific instruments, verifying or altering the second of the minute in his chronometers, as the case may be. It is the more interesting because there is nothing lucrative in the profession. Makers of many kinds of scientific instruments realize handsome returns from their toil. Mathematical, optical, engineering, and other instruments are in constant demand. A marine chronometer is the representative of a ship, for no ship requires more than one of them. If a vessel is wrecked, and anything be saved, the chronometer is the first article of property that is taken into the life boat; so the result is that the market is well supplied, and that the demand for the exquisite timekeeper is extremely limited.

The makers in this country import none of the material they employ excepting the brass frame in which the movement is inclosed. To produce a single one requires the constant labor of the maker for from two and a half to three months, and three months at least are required after it is finished to rate and regulate it. To get a chronometer from a Liverpool maker it must be ordered—unless the man have one on hand—from nine months to a year in advance of occasion for its use. England is the chronometer maker for all Europe. The Swiss make the cheapest watches in the world, just as they make cheap music boxes, cheap pictures, and curiosities in carved work. But their watches lack the solidity of those of English make. Any reader of Dickens who can recall the description of Mr. Gradgrind's watch, with its "gnashing" tick, will comprehend the difference between it and the general tap of the escapement in the watches of Lochle or Geneva.

But the Swiss have never yet made reliable chronometers. They are too far inland to render the study an object, and the astronomical accomplishment necessary to rate them. The man who can "rate" a chronometer—give him the nautical skill to handle her, and the necessary charts—could of course sail a ship in any waters.

Our veteran Philadelphia maker, Mr. Harpur, seems to be widely known. He has made about two hundred marine instruments, which he modestly thinks is more than have been made by any one gentleman, so far, in the United States. An item of information which our reporter did not get from him, is that Semmes, after taking a Philadelphia ship, and finding one of Harpur's chronometers on board her, displaced the instrument he had in use and substituted Harpur's in its stead. That chronometer was in the cabin of Semmes, on the Alabama, when she went to the bottom of the English channel. The ocean vagabond had as many as twenty chronometers at a time, taken from vessels that he had burned, but he gave the preference over English, French, and all others that he had captured, to the one made in Philadelphia. The thief is not as stupid as he appears, when chronometers are the test of his intelligence.

The cost of a first class ship's chronometer is about $400. It would be much more, but that the larger the instrument the less jeweling it requires. What we mean by this is that the frame is sufficiently heavy to sustain the shafts in their bearings without the aid of many jeweled holes. Perfect *fac similes* of the mariners' chronometer are made for the pocket, but to possess one is an expensive luxury. In a plain silver case, four hundred and fifty dollars is about the average price. Each shaft must be inserted at either end in a ruby, sapphire, or diamond, drilled for the purpose. A large portion of the work must be done under a magnifying glass. In the whole range of mechanics or arts there can be nothing, excepting steel plate engraving, that is more trying to the eye.

Chronometer making could never be adopted as a profession by any other than a man who loves science more than he loves silver. More of the pocket sizes are sold than those constructed for a stationary position in the captain's cabin of a ship. A gentleman who chooses to give five hundred dollars for a pocket time-piece gets a chronometer, but very few people care for that degree of accuracy in a watch that puts to the blush the town clocks, and time-pieces in the pockets of friends. For this reason, whenever our reporter passes the observatory of our Philadelphia chronometer, and ponders

upon the sacrifice that he makes to science, his hat, won at the last election, is tenderly and deferentially doffed.—*U. S. Gazette.*

Cider Making.

Portable cider mills that can be worked by hand are very convenient and useful, when there are but few cider apples to be worked up. It often happens that a farmer has a few bushels of apples that will not keep till the time of making the main crop into cider, and in this case a portable cider mill will enable him to use them to advantage; but when there are several hundred bushels of apples ready at one time, the old fashioned custom of taking a load of apples and straw to the nearest cider mill is the pleasanter, and we believe the more profitable plan. It is a kind of holiday for the boys. The apples are allowed to hang on the tree as long as the wind and frosty nights will let them. The riper they are, the better the cider. They are picked up and placed in a large heap, either in the orchard or at the cider mill, and are allowed to lie a few days to complete the ripening process, in which the starch is converted into sugar. They are then rasped or ground into pulp. If the weather is cool and the apples not quite ripe, it is better to let the pulp remain in the vat a few days before pressing out the juice. This gives the cider a higher color, makes it sweeter, and of better flavor. The process of pressing is simple, but requires some skill. Four boards about six inches wide are nailed together in a square, the size it is desired to make the cheese, say from four to five feet. This is placed on the bottom of the press, and a little clean rye or wheat straw, pulled out straight into bundles, is put inside with the ends extending about a foot all around. The pulp is then put into this rim forming a layer about six inches thick; the straw is then turned on it, and a little pulp placed on the straw to keep it down. The rim is then lifted and a stick is placed at each corner on the layer of pulp added and the straw turned over it as before. This process is repeated until the cheese is as large as desired, using say from seventy-five to a hundred bushels of apples.

The cider will commence to flow at once, and it is better to let the cheese settle down somewhat before turning the screw. If pressed too much at first, the pulp may burst out at the sides. The cheese is generally allowed to remain under the press all night, and before leaving in the evening, the screw is turned as tight as possible. In the morning additional pressure is given, and when the cider has ceased to flow, the screw is turned back, the boards taken off, and the corners of the cheese are cut off with a hay knife and the pomace laid on the top. The pressure is again applied, and the cider will flow freely. As soon as it ceases, remove the pressure and cut off four or five inches of pomace from the sides of the cheese, place it on top, and apply the pressure again as long as any cider will flow. Eight bushels of good apples will make a barrel of cider. The cider is usually put in barrels at once and sold while sweet.

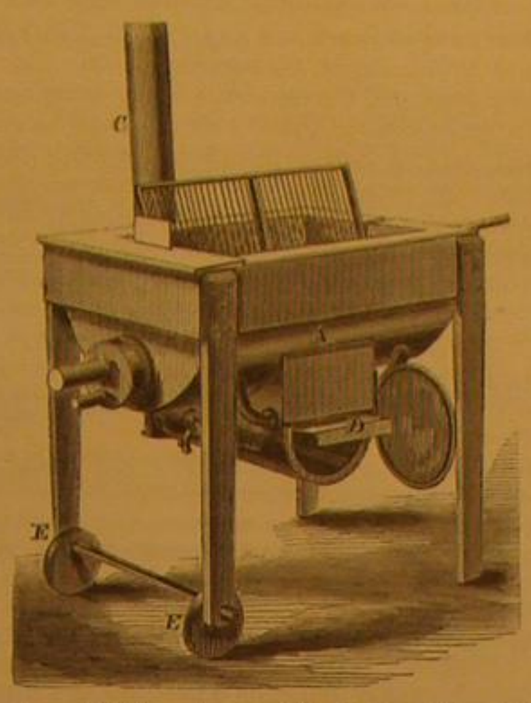
Strictly speaking, we suppose the sweet juice of the apple is not cider, any more than the sweet juice of the grape is wine. It is converted into cider by fermentation. Those who prefer sweet cider resort to various methods for arresting this process, such as putting a handful of powdered clay into each barrel, or two or three pounds of well burned charcoal. Others add a little mustard seed. Sometimes a few gallons of cider are placed in the barrel, and then a rag dipped in brimstone is attached to a long tapering bung; this is ignited and the bung loosely inserted. After the brimstone is consumed, the barrel is rolled until the cider has absorbed the sulphurous acid gas. The barrel is then filled up with cider. The sulphurous acid gas acting on the albuminous matter in the cider arrests fermentation. The objection to this method is that, if too much gas is absorbed, it may prove unpleasant if not injurious. To obviate this, sulphite of lime is now used, which has the property of checking fermentation. We have tasted cider preserved in this way that was excellent, and we have also tasted some that was execrable. It is not an easy matter to keep cider sweet and pure for any length of time, especially if the weather is warm. If the cider is not made until just before winter sets in, and can afterwards be kept at or near the freezing point, it will remain sweet and excellent.

To make good fermented cider that will keep a year or more without turning too sour to be used for anything but vinegar is not a difficult matter. The first thing is to exclude all decayed fruit, but it should be quite ripe. Not a drop of water should be used in the process of manufacture. The sweeter the juice, the stronger the cider, and the better it will keep. Put the barrel immediately in a cool cellar—the cooler the better. The fermentation may go on slowly or rapidly, practice differing in this respect. In the former case the liquid is treated in all respects like wine. The cask has a bung in which is fixed air-tight a tin tube bent at right angles, or a piece of india-rubber tube. The free end of the tube in either case dips into a vessel of water. This arrangement allows the gases liberated in fermentation to pass out, and the end of the tube being covered with water, air cannot pass in. The bubbling of the gas through the water shows how the fermentation is progressing. When this has ceased, the cider is racked off into clean casks, which are to be full and bunged tightly. The following treatment is communicated by an English friend, which he assures us is attended with good results. Most readers would probably prefer their cider and beefsteak separate.

"Put into the barrel of cider five or six pounds of loaf sugar, and a pound of raw, lean beefsteak. Let the bung be open; keep the barrel full, so that, as fermentation takes place, the scum thrown to the surface may run off through the bung. Some cider should be reserved to be added every day or so, to supply the waste of fermentation. When all the scum is thus worked off, bung up the barrel tightly and place a few handfuls of wet sand on the bung, pressed firmly to exclude the air."—*American Agriculturist.*

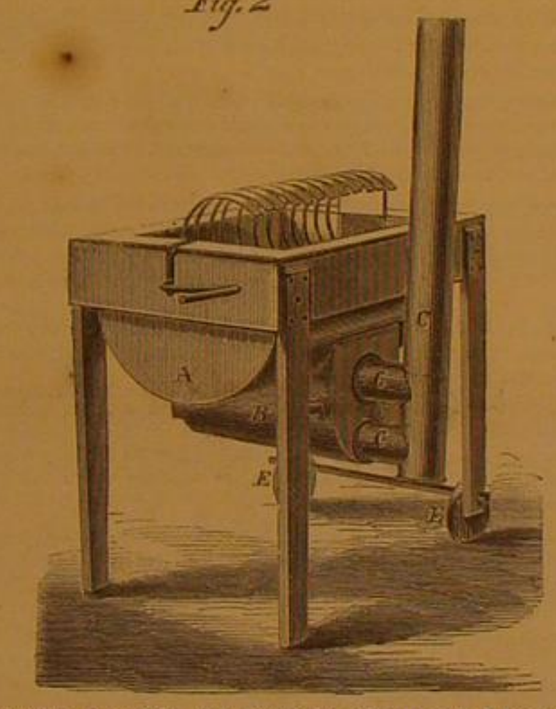
COLVIN'S PATENT CHEESE VAT.

Cheese making in this country, has of late years risen from the position of a merely household industry to the dignity of a distinct branch of our manufactures, and "cheese factories" sound now no stranger to the ear than cotton or woolen factories. Whether cheeses are made at home on the



farm, or in establishments specially designed for their production, the principles governing the processes of manufacture are the same, and they must be understood, and corresponding appliances used. The objects to be attained are a separation of the caseous or cheesy particles from the whey or watery particles of the milk and the proper comminution of the former preparatory to pressing.

Fig. 2



The device shown in the engravings is intended to produce these results more effectually, rapidly, and economically than can be done by the ordinary processes. Fig. 1 is a front view of the machine in perspective; Fig. 2, a rear view; Fig. 3, a stirring frame, and Fig. 4 a cutting frame, both these last operated by a crank. The vat, A, is semi-cylindrical and double walled, water being contained between the shells. Under the vat and attached thereto is a furnace, B, for heating the water, the smoke from which escapes by the pipes, C. The degree of heat admitted to the water is regulated by a sliding damper, D, in Fig. 1. A coil of circulating pipes is

Fig. 3.

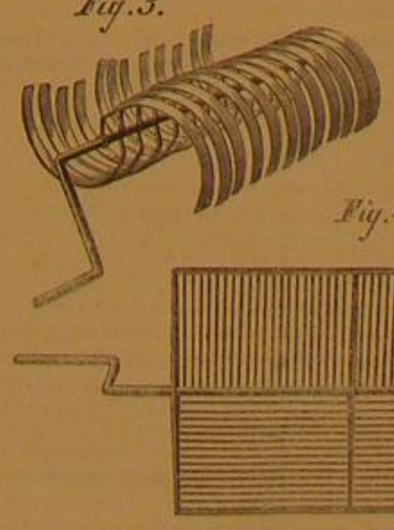


Fig. 4.

affixed to the outer shell of the vat, connecting with the water space at center and ends of the vat, thus equalizing the heat in the water space. Convenient spouts or cocks are attached for drawing off the whey, the water from the water space, and discharging the curd. To aid in this, one end of the machine is set on eccentrics, E. For keeping the curd separate during the operations of scalding, salting, and cooling, a stirring frame, Fig. 3, consisting of curved paddles, is used that is turned by a crank; this does the work usually performed by hand with a paddle. It is seen placed in the machine in Fig. 2. The cutting frame, Fig. 4, seen in place in the vat Fig. 1, cuts the curds into small blocks by the longitudinal and transverse cutters on the rotating frame. This not only cuts the curd, but by its sweep cleans it from the inner surface of the vat. Either of these revolving frames may be lifted instantaneously from the vat, as the shafts bear at one end on a fixed pin, and at the other rest in an open box.

At the discharge end of the vat—Fig. 1—is a semi-circular recess separated from the vat proper by a strainer plate sliding in vertical grooves in the inner shell of the vat, and can be withdrawn vertically when the curd is to be discharged into the hoop of the press.

Patented July 28, 1868, by Paschal Colvin, who may be addressed for machines, rights, or further information at Pecatonica, Winnebago Co., Ill.

Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents.

Chrome Iron.

Messrs. Editors:—The use of chromate of iron, or chrome ore, for hardening iron, has long been known; but it is only recently that attention has been paid to its practical use for this purpose, the chrome ores having been almost exclusively used for the manufacture of bi-chromate of potash for coloring purposes. Late experiments have demonstrated its superiority as an alloy for hardening steel, and for the manufacture of burglar proof safes, resulting in the formation of a company in New York with a capital of $400,000, for the manufacture of chrome steel, which is now before the public for commercial purposes, in quantity and of a quality not surpassed (if equaled) by any steel heretofore produced. The chrome iron safes are cast, and are impervious to acids or drills, and the material is by far the hardest metal ever discovered.

According to Berthier, iron and chromium (metallic chrome) may be alloyed in every kind of proportion; an alloy containing 60 per cent chromium scratches glass almost as deeply as a diamond, its hardness is so great. These alloys may also be made with chrome iron ores, by using a flux to retain the silica and alumina which may be present in the ores. A good flux for this purpose is a mixture of 100 parts glass (free from lead), and 40 of glass of borax, to 100 of ore.

According to Fremy, an alloy of iron and chromium may be formed by heating, in a blast furnace, oxide of chromium and metallic iron; it resembles cast iron, and scratches the hardest bodies, even hardened steel.

Experiments are now being made at four of the largest rail mills in the United States, in order to test the value of an alloy of chrome ore and manganese, with the iron in the puddling furnace, for hardening rail heads, and with every prospect of a successful result. The United States Government has ordered an experimental lot of projectiles to be made of chrome iron, or chromated iron, in order to test the penetrability of projectiles thus hardened upon iron plated armor; and while these experiments are going on for purposes of destruction, other experiments are being made to test the value of the process for the peaceful purpose of hardening plow castings, railroad car wheels, and other articles of iron fabrication, where there is great wear from friction, and requiring to be made very hard.

The supply of chrome iron ore in this country is quite extensive; and it is found of superior quality at the Bare Hill, about six miles from Baltimore, in Harford County, and in other parts of Baltimore County, and many parts of Chester, Delaware, and other counties of Pennsylvania; and if required, can, no doubt, be supplied from these sources in any quantity demanded by the most of the iron manufacturers.

Baltimore, Md. C. L.

Steam Boilers and Steam.

Messrs. Editors:—I saw an account of an experiment that a Frenchman tried on a steam boiler in France, several years ago, which increased the power of his boiler one half. It was in the Scientific American that I saw it, but do not recollect the date. He attached an air pump to his engine, and forced air into his boiler with the feed water. If that is a fact, why has it not come into general use? And is the thing practical or not? What is steam? If it is water expanded by heat, why does not the whole body of water expand and fill the boiler, and why does it not increase the pressure of steam by superheating it?

Make a fire under your steam boiler, without any water in it, and you can get no pressure in your boiler; add water, which is incompressible, and you get an elastic fluid or gas. Is making steam a chemical or mechanical process? Is the evaporation of water by the sun's rays, or by passing a current of air over the water, the same as making steam in a boiler under pressure? What property does water lose by being converted into steam? I have made steam my study for the past eight years, and my experiments show me some facts in relation to the above questions which I have not seen in print, although they may be old. Your answers to the above questions will be received with much pleasure? E. M.

Boston, Mass.

[Our correspondent has a curt, off-hand way of asking questions difficult to answer in our columns, and more appropriately addressed to writers of works on natural philosophy than to the conductors of a periodical.

In regard to the French experiment—of which, however,

we have no recollection—we presume it was simply an attempt to introduce air in the water of a boiler, to which much importance has been attached in this country by some. We do not share in the belief of its necessity, but, if required, there are but few feed pumps which do not occasionally force air, without water, into the boiler; and all water forced in ordinarily contains more or less air.

Steam, as defined by Webster, is the "vapor of water; or the elastic aëriform fluid generated by heating water to the boiling point." Thus, steam is not "water expanded by heat," and that is why the whole body of water does not "expand and fill the boiler." It is not the water that expands but the elastic fluid known as steam, two of the qualities of which are dryness and invisibility. It does increase the "pressure of steam to superheat it." Regnault says that steam, at 100 lbs pressure, which may be considered "dry steam," as usually understood, has a temperature of 338°, but at 230 lbs. pressure it's temperature is 398°+. For further particulars regarding steam we refer you to any of the text books.

Making steam, or rather generating steam from water, is a purely mechanical process. The evaporation of water by the sun's rays or any other cause is making steam as much as is the application of heat to water in a boiler under pressure. In the one case its elasticity or pressure is no greater than that of the atmosphere, while in the other case, by confinement, it may be many times more.—Eds.

"Greasy Mechanics."

Messrs. Editors:—Your article headed as above will meet the approbation and awaken the sympathy of the class whose claims it advocates. There may be many persons who believe that the profession of the mechanic and his labors are inferior in value to those of others in different departments of human labor; but does it occur to these that without the aid of the mechanic, as such, the world would now be at least three hundred years behind in civilization?

Where would have been the steam engine without a Watt? Where would have been spinning machinery without an Arkwright? Where would be the transportation on our rivers, lakes, and oceans without a Fulton? Where the vast agricultural interest in the production of cotton without a Whitney? How should we cross a continent in six or seven days without a Stephenson? How should we converse with our friends across the Atlantic without a Morse? Yet these men were all mechanics!

Who will deny the blessing within the reach of every family introduced by Elias Howe? We know that he was a mechanic working for nine dollars a week during the day time and toiling nights in his attic to bring out the conception of his brain, the sewing machine, which to-day blesses the whole civilized world.

And allow me here to say, that of all the almost infinite variety of these, not one successful one that does not combine his ideas, thereby paying tribute to his genius.

The works of our mechanics, the services they have rendered to civilization, to Christianity, to liberty, to the amelioration of the condition of mankind, are their monument—their eulogy. Mechanical Engineer.

New York city.

Something About Hemp.

The comparative value of different sorts of hemp, as it regards durability, is easily and speedily tested by any one, since nearly all kinds are very short-lived when exposed to causes favorable to decay. The Manilla will last some four or five months, as used in the summer season upon our steamboats. The Sisal, which is often sold under the name of the former, will not last more than half as long. The Russian hemp, when kept moist and warm, will lose its strength in about three weeks; the American water-rotted in two weeks, and the dew rotted in from five to ten days. Different experiments, however, exhibit different results in respect to the durability and strength of the various kinds of hemp

In Russia, hemp is assorted, according to its quality, into clean hemp or firsts, out-shot hemp or seconds, half-clean hemp or thirds, and hemp codilla. Of the first three sorts an immense amount is annually brought from the interior beyond Moscow, its quality very much depending on the region in which it is produced. That brought from Karatshev is the best; next to this, that produced in Beteo; hemp from Yshatsk is considered inferior to the latter. As soon as the hemp is brought down in the spring, or in the course of the summer, it is selected and made up in bundles with great impartiality and exactness. A bundle of clean hemp weighs from fifty-five to sixty five poods; a bundle of the out-short, forty-eight to fifty-five; and a bundle of half clean, forty to forty-five—one pood being equivalent to thirty-six pounds. The external marks of good hemp are, its being of an equal, green color, and free from spills; but its good quality is proved by the strength of the fiber, which should be fine, thin, and long. The first sort is quite clean, and free from spills; the out-short is less so; and the half-clean contains a still greater portion of spills, and is, moreover, of mixed qualities and colors. The part separated, or picked out in cleaning hemp, is called hemp codilla, and is generally made up in quite small bundles.—*Commercial Bulletin.*

Twenty years ago, Grace Church, opposite Eleventh street was placed a short distance above the fashionable quarter of New York. Now it is so far down town and business presses upon it so closely that the society propose to sell out and remove further up town. The ground is valued at $600,000. The old New York Hospital between Duane and Worth sts., one of the ancient landmarks of the city proposes to move away from its present valuable site. We have heard the ground estimated to be worth as high as four million dollars.

Manufacturing, Mining, and Railroad Items.

Carbonate of lead has been discovered in St. Francois county, Mo.

The new cotton mill at Suncook, N. H., will be, it is said, the largest building in the State.

A lumber mill at Portsmouth, Mich., recently cut 130,352 feet of lumber in ten hours and forty minutes.

A mill for manufacturing wrapping paper, and eventually print stock, will soon be erected in Nebraska city.

A bismuth mine has been opened in Wayne county, Mo., that aside from its value in bismuth is rich in silver.

The Shawmut Oil Company, at East Boston, runs fifteen stills, having an aggregate capacity of five hundred barrels of oil per week.

A company has been formed in London for the manufacture of beet root sugar on a large scale. This business is growing rapidly.

The Iron Mountain, in Dent county, Mo., is to be examined by Pennsylvania iron men with a view to making pig iron.

The largest vinegar manufactory in the country is said to be at Detroit, Mich. Its capacity is five hundred barrels per week.

An English company have after overcoming almost insurmountable difficulties established extensive iron works at Zimapan, in Mexico.

The Rhode Island Locomotive Works are turning out locomotives at the rate of five per month. The capacity of these works is soon to be doubled.

The Trenton Iron Works at Trenton, N. J., have been purchased by the Erie Railroad Company and are to be removed to some place on the line of the road.

A copper kettle of 1,540 gallons capacity, has just been put into a brewery at Zanesville, Ohio. The bottom of the kettle is a solid piece of copper weighing 875 pounds.

The locomotive business seems to be lively. A firm in Boston has just been obliged to decline an order for $200,000 worth.

A new artillery locomotive has been invented, armed with two pieces of artillery, and intended to perform scouting duty on the banks of the Rhine.

The Emperor of China has opened the port Chifau, on the Gulf of Pechele to foreign trade.

A new deep sea submarine telegraph direct from Malta to Alexandria Egypt, was successfully completed on the 2d inst.

The Pennsylvania Central Railroad has reduced its freight charges to all pivots in the West, to correspond with those of the New York roads.

Considerable excitement prevails at Laramie over new gold discoveries forty miles west of that place, said to be richer than any that have been made in that section.

Chemical manufacturing, though quite in its infancy on the Pacific coast, is already entered upon by competing firms which display considerable energy within the limited field opened to them by the demands of the market.

Some of the copper ores from the Planet mine in Arizona embracing carbonates, sulphates, silicates, the red oxide, and native copper, are said to assay from 50 to 60 per cent of copper.

There are thirty-two manufacturing establishments in North and South Adams, Mass., having an aggregate capital of ten millions of dollars, and employing from 3,000 to 4,000 hands.

Great excitement is reported in the western portion of Idaho concerning the discovery of gold in the Cœur d'Alene Mountains. The road is crowded with miners from Beartown to the new diggings. The precise location of the mines has not been announced.

The Winnemucca *Argent* says: "At no time in the history of Humboldt mining has there been more well-directed labor put upon mines, and in no instance that we know of is it being done for other than purposes of permanent development."

Hartford will soon vote on subscribing $500,000 for each of the two railroad enterprises now being agitated—the Valley Railroad and the Connecticut Western. It is thought by its leading men that the vote will pass in favor of the roads.

One of the great railway companies of England is about to defend itself against several suits for damages, for having set fire to the crops along its route by sparks from locomotives. It disputes its liability in such cases. Other lines which have suits pending are awaiting the result with great interest.

The principal seat of the saddle tree manufacture in this country is St. Louis. There are ten firms engaged in the business in that city. Hackberry and sycamore are the principal woods used, and the aggregate value of the product foots up from $300,000 to $500,000 annually.

The *Industrial American* says that buckwheat has been made use of in dyeing wool. An infusion made from the succulent stems and blossoms, with the addition of a preparation of bismuth of tin, produces a beautiful brown color. From the dried flowers are obtained different shades of green. The Siberian buckwheat yields a fine yellow which, when the wool is still further boiled in the dye, changes into a golden tint and at length becomes a beautiful yellow.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents

Rail Joint or Coupling.—E. G. Patterson, Pithole City, Pa.—This invention has for its object to furnish an improved coupling or joint for the rails of railroad tracks, which shall be so constructed as to securely connect the ends of the rails to each other without weakening the said rails by the formation of bolt holes, and in such a manner that the said ends may receive a steady straining support.

Governor for Water Wheels.—James P. Sibley and Arthur Walsh, Bennington, Vt.—This invention relates to a new and useful improvement in governors designed more especially to be applied to water wheels.

Brake for Sewing Machines.—James S. Fowler, Racine, Wis.—This invention has for its object to furnish an improved brake, designed especially for attachment to the Wheeler & Wilson sewing machines, but equally applicable to other machines, which shall be so constructed and arranged as to prevent the machine, when being started, from running backward and thus breaking the thread, and which shall at the same time be simple in construction, effective in operation, and easily applied to any machine.

Car Coupling.—H. C. Glasgow, Cleveland, Ohio.—This invention relates to a new car coupling which is so arranged that it can be easily and cheaply made and kept in order, and also to a new manner of constructing and arranging the flooring of the car between which the coupling devices are held.

Machine for Scouring and Cleaning Sheet Metal.—Horace B. Wooster, Waterbury, Conn.—The object of this invention is to clean or scour sheet brass and other similar metal after annealing, either before or after it is finished, without the use of sand or other similar material, and it consists in a novel arrangement and combination of circular wire brushes, movable riders, and a rotating scouring-up cylinder.

Children's Carriage.—Francis Boyiston, New York city.—This invention relates to a new manner of hanging the front axles of that class of children's carriages which are known under the denomination of "perambulators," and consists in fastening the front ends of the sills to nuts that are screwed to the ends of the axle, said nuts also forming flanges to keep the hubs of the wheels on the axle. By detaching the nuts from the sills, they are free to turn, and can then be taken off the axle, to allow the removal of the wheels. In this manner a very simple and efficient device is provided for retaining the wheels on the axle and for holding the axle on the frame of the carriage.

Apparatus for Lifting and Transporting Sugar Pans.—Andrew J. Wood, Hardwick, Vt.—This invention has for its object to furnish a simple and convenient apparatus for raising and removing the pans from the furnace in sugar houses, which shall be so constructed and arranged that the pans may be removed from the furnace easily and promptly when required, and which shall at the same time be wholly out of the way when not in use.

Cultivator.—D. S. Early, Hummelstown, Pa.—The object of this invention is to improve the cultivator by making it neater and simpler in construction than adjustable cultivators have been made heretofore, and by providing it with novel devices for adjusting the plows, and controlling the depth to which they will run in the ground.

Grain Drill.—M. F. Lowth and T. J. Howe, Owatonna, Minn.—This invention has for its object to provide a simple, cheap, and durable apparatus for regulating the feed of grain drills, so that they can be adjusted to feed one, two, three, four, etc., bushels to the acre, and so constructed and operating that the device can be perfectly regulated, and when necessary its parts can be taken apart and put together again without difficulty, in the field or elsewhere.

Apparatus for Treating Milk.—Joel A. Otis and Thomas Barber, Watertown, N. Y.—This invention is a simple and cheap device for warming milk in the process of manufacturing cheese, and consists in a furnace, boiler, and milk tank, so constructed, arranged, and operating that the heat is applied uniformly at all parts of the tank where it is required, and in such a manner as to utilize all the heat and warm the milk rapidly without scorching or injuring it in any degree.

Steam Generator.—C. F. Trill, Baltimore, Md.—This invention has for its object the construction of a strong and durable steam generator, to be heated by petroleum or other liquid or gaseous fuel.

Horse Hay Rake.—G. M. L. McMillen, Dayton, Ohio.—The object of this invention is to improve the manner of fastening the wire teeth of horse hay rakes to the axle, and of arranging the spring bar and the springs and guides that operate in connection with the rake teeth.

Tea Tray.—S. N. Trump, Baltimore, Md.—This invention consists in making the body of the tray of wood, either in a single piece or in panels, and in extending a metallic rail nearly around its upper edge, the same being supported by short posts or standards, and the whole resting on suitable legs.

Spike.—R. K. Walton, Clarington, Ohio.—The object of this invention is so to construct a spike, for railroad purposes or for common use in spiking planks to timbers, or in spiking timbers together, for ship building or other purposes, that the spike can be firmly imbedded in the wood, so that it cannot be withdrawn or even moved or started in its bed, by any vibration of the wood or of the spike, or by any extracting instrument which will not tear away or remove the wood itself.

Sash Fastening.—William Brown, Duncannon, Pa.—In this invention a single fastening is employed to lock both sashes in any required position. The device is simple, cheap, easily operated, and not liable to get out of order.

Car Coupling.—A. J. Elder, Kansas City, Mo.—This invention has for its object, in addition to the connecting of cars, their uncoupling in a certain and efficient manner, in case one or more of the carriages of a train be thrown from the track, in order that the displaced car may not drag the others after it.

Plow.—S. T. Denise, Redbank, N. Y.—This invention is an improvement in the construction of the coulters, standards, and braces of a plow, whereby the instrument can be made more simple, strong, and durable, and at less expense than heretofore. The plow is, at the same time, so formed that it will not clog, but will clear itself.

Ice Preserver.—Julia W. D. Patten, New York city.—The object of this invention is to provide a neat and cheap receptacle, which will protect ice, food, medicines, etc., from the action of the air, and having its walls made of a substance, herein described, which is a remarkable non-conductor of heat will maintain around the inclosed contents of the receptacle a uniform temperature thereby preventing the melting of the ice and the decomposition of the food, medicines, chemicals, or other article to be preserved.

Butt Hinge.—H. Hockemeyer, Toledo, Ohio.—This invention relates to an improvement in the construction of hinges or butts for hanging doors, and for other purpose.

Drawing and Writing Slate.—F. Melville, New York city.—This invention relates to a new and improved mode of applying a writing or drawing copy to a slate.

Rotary Engine.—Elim Osborn, Economy, Ind.—This invention relates to an improved method of applying steam to a rotating wheel for driving machinery, and for all other purposes for which steam engines are used.

Stave Machine.—James Holmes, Belfast, Maine.—This invention relates to a new and improved machine for sawing staves; and it consists in a novel means employed for operating the bolt carriage, whereby the bolt is automatically fed to the saw, and rigged back from the same, and the bolt also set to the saw, at the termination of the rigging back movement.

Adjustable Ventilating Apparatus.—Jethro Peckham, and John Peckham, Middletown, R. I.—This invention consists in supporting the wedge cover upon vertically adjustable supports, and combining therewith a wind lass for raising or lowering it to open or close the ventilating passage through the wedge.

Reversible Barber's Chair.—Albert Gerdes, and Julius Reiche, New York city.—The present invention relates to a new and useful improvement in barbers' chairs which are so constructed that, by a single movement, the seat, back, and head rest, may be removed, simultaneously. The object in reversing the seat, back, and head rest, is for the purpose of giving each new comer a cool seat, and by thus reversing the parts it will prevent dust and dirt from collecting around the edges, as well as airing the parts at the same time.

Pattern Chart for Cutting Shirts.—James H. Myers, New York city.—The object of this invention is to produce a set of diagrams for men's shirts, which one set will be sufficient for cutting shirts of all sizes for persons of various forms. The invention consists in so forming the diagrams for the various parts of the shirt that those edges which will be changed for persons of different size, will be graduated and numbered, so that when the requisite measurement is known, the necessary line can at once be pointed out.

Folding Chair.—Chas. C. Schmitt, and Rudolph Wodrich, N. Y. city.—The object of this invention is to construct a chair of ordinary or suitable form, in such manner that it can be readily folded together to occupy but little room This is important, not only for transporting chairs, but also for crowded rooms in which chairs when used can be easily folded into a small compass. The invention consists in pivoting the legs of the chair to the seat of the same, and in connecting their respective braces in such manner that the desired result is obtained, and that the chair, when in use, is entirely firm and reliable.

Slat Matting.—William Barton, Troy, N. Y.—This invention consists in such an arrangement of the cords or strings, by which the various slats are connected into an elastic matting that by winding the string around itself or by tying knots unto the same, the buttons or washers for holding the slats the requisite distances apart, may be dispensed with, the said knobs or windings being the substitutes for the said buttons or washers.

Folding Easy Chair.—Charles C. Schmitt and Rudolph Wodrich, New York city.—The object of this invention is to produce an easy chair, which is so arranged that its seat can be adjusted higher or lower, and locked in any desired position, and that its back can be set, more or less inclined, and taken at any desired angle of inclination.

Feeder and Cooler.—John Nairn, Milton, Ind.—This invention consists of a vessel which is secured to the top of the ball of a running stone, and provided with two tubes extending downward near to the bed stone, with which the article to be ground is fed by a tube fixed to the mouth of the hopper, and extending near to the bottom of the said vessel when it is provided with arms which act as scrapers when the said vessel rotates by the action of the stone, to force the materials into the said tubes. The vessel is also provided with hollow curved arms for gathering and forcing air down through the feeder to facilitate the feeding, and to cool the stones.

Saw Set.—L. T. Smart, Ossipee, N. H.—This invention consists of a circular bed die fitted into a suitable die holder, so as to turn thereon on a ver-

tical axis, which is provided with a square socket in its central axis, and with four or any other suitable number of inclined facets on its upper end varying in degree of angularity which serve as the bed on which the teeth are to be hammered to produce the required set, and a movable die provided with a central shank, which fits in the recess of the bed die, arranged in combination therewith, having a corresponding number of facets of various degrees of angularity corresponding with those of the bed die, supported in a vertical position therein, and the facets maintained a short distance above those of the bed die by a suitable spring. The bed is provided with gages, whereby the saw may be presented so that the teeth may be suitably acted upon by the said dies when a blow is given to the head of the movable die.

IMPROVEMENT IN SPRING SEATS.—Charles B. Smith, Springfield, Ill.—This invention consists in forming the main portion of the bottom of the seat of thin strips of metal laid longitudinally and transversely, and riveted at the intersecting points, the end of which strips are provided with hooks, which hook into and are supported by loops projecting from double coiled springs secured to rods or bars connected to the base or frame of the seat.

IMPROVED CARRIAGE WHEEL.—John G. Buzzell, Lynn, Mass.—This invention relates to that class of wagon wheels, in which tight metallic spokes are used, and consists, first, in fastening the out ends of the spokes to springs inserted in the felly; second, in forming annular chambers around the hub for the reception of the inner ends of the spokes, and of the nuts, by which such inner ends are fastened; the chambers allowing the nuts and inner ends to play if the rim of the wheel should be somewhat contracted.

IMPROVED FILTERING AND VINEGAR APPARATUS.—Theodore Grundmann, Cleveland, Ohio.—This invention relates to a new apparatus for making vinegar from suitable fermented liquids, and consists, first, in substituting for the shavings generally employed braided straw, cotton, or hemp, strings, which are held suspended, and along which the liquid has to flow down in small streams.

IMPROVED TRUSS.—John Burnham, Batavia, Ill.—This invention relates to a new and useful improvement in trusses, and it consists in attaching the head lever to the band by means of a ball and socket joint.

IMPROVEMENTS IN NAIL MACHINES.—W. H. Battelle, Youngstown, Ohio.—The object of this invention is to provide an improved nail cutting machine, the improvements being in the arrangement of the nipper, and the means of actuating the method of securing the heading dies, and the arrangement of the feeding apparatus of a machine arranged to form a head alternately on each side.

SOLVENT AND DETERGENT PROCESS.—James G. Marshall, Leeds, Eng.—This invention relates to a new mode of combining the influences of high temperature and great pressure in solvent or resinous matters adhering to the fibres of various fibre yielding plants, or for cleaning fibrous material of animal origin, such as wool or silk, from some of the extraneous matters that may be adherent thereto. I effect these objects by enclosing the material fibres or fabric to be operated upon in a closed vessel or chamber of a shape and strength suited to resist the amount of internal pressure that is intended to be employed to force the solvent or divergent liquids through the fibres when the goods to be operated upon are arranged in the vessel.

LANTERN—G. W. Putnam, Boston, Mass.—This invention relates to a new and useful improvement in that class of lanterns which are designed to be more portable that the ordinary or original kind, and which are adjustable so as to be capable, when not in use, of being or arranged so that one part may be fitted within the other.

PADLOCK.—G. W. Dana, Racine, Wis.—This invention relates to a new and improved padlock and it consists in a peculiar construction of the same, whereby a very simple, economical, and secure lock of the class specified is obtained.

CAR COUPLING.—H. C. Glasgow, Cleveland, Ohio.—This invention relates to a new car coupling of that class in which the coupling box is made backward and forward movable; and its object is to so arrange the coupling box, its connections with the car body and the coupling pin, that the coupling link can be inserted from above or below, even if the cars to be joined should close together; to prevent the bending or breaking of the coupling pin, by the insertions into the box of a link on the opposite car; and to insure safety and convenience, by the construction of the devices which connect the coupling box with the car body.

MILK VAT.—John A. Edwards, Waterford, Pa.—This invention consists of a vat, whereon the milk is to be set, and in which water is used for governing the temperature of the water, and an agitator whereby the water is caused to circulate freely under the milk cans which are suspended in suitable numbers above the water of the vat or so that they come into contact with the water. The vat is provided with a gate to separate the part of the vat to which the heater is connected from the part which the water communicates with the pans when desired.

SKIRT SUPPORTER.—N. A. Vargason, Brooklyn, N. Y.—The nature of this invention relates to the supporting of ladies' skirts whereby the weight of the latter is not required to be sustained by tieing the same tightly around the waist with strings or similar fastenings.

HORSE HAY RAKE.—Peter Prescott, Boonville, N. Y.—The object of this invention is to provide a horse hay rake which is conveniently operated, and which is almost if not entirely free from the objectionable downward pressure of the shafts upon the horse drawing the same. Other devices perfecting the whole render the rake of light draft and effective in operation.

HORSE POWER MACHINE.—B. H. Wilcox, Petroleum Center, Pa.—The object of this invention is to provide a simple and portable horse-power machine for the purpose of sawing logs on the spot where the tree is felled, and for other purposes where a simple and cheap machine is required for the transmission of horse-power. It consists in general terms of a cam table turned by a sweep; the cams of the table vibrating a roller lever as the table revolves. The lever is connected with the same or other mechanism by a rod.

CLAMP FOR CROSSED RODS OR TUBES.—James M. Moorehead, Brooklyn, N. Y.—The object of this invention is to provide a firm and easily adjusted clamp for the purpose of clamping the vertical and horizontal rods of engineering or other structures when each crosses each other at right angles and are sufficiently approximated at the line of their line of crossing to admit of being held in the same clamp. It is probably used more in the construction of iron railway cars where two vertical rods and a horizontal rod are clamped together at different points on the top and bottom of the car.

DOUGH MIXING MACHINE.—François Grenier, Beroserac, France.—The object of this invention is to construct a machine for mixing dough, in which the motions of the arms during manual operation are as nearly as possible imitated. The invention consists in arranging within an annular wooden vessel to which rotating motion is imparted, two sets of rapidly revolving stirrers or manipulators, of which one set constitutes the beaters, for agitating the dough, while the other is a set of spiral blades, which move the dough vertically, as is also done by hand during manual operation.

LINIMENT FOR RHEUMATISM.—A. M. Dennen, Folsom City, Cal.—The object of this inuention is to provide a medical compound which is an effective remedy in treating rheumatism by topical application.

WATER GAGE.—H. P. Stafford and H. H. Stafford, Decatur, Ill.—The object of this improvement in water gages is to indicate the hight of water in a steam boiler, so that the attendant can see by the position of a pointer on a graduated limb or index just where the solid water stands, though the water may be foaming to such an extent that this important knowledge cannot be arrived at by means of the ordinary gage cocks, or any other ordinary device heretofore used.

WASHING MACHINE.—John Stafford Kelly, New York city.—The object of this invention is to provide a simple and effective washing machine. It consists of an oscillating drum or barrel provided with a lever handle or other convenient means of actuating it, and also a number of floating rubbers composed of a canvas sleeve containing a number of wooden balls arranged in a row, together with other devices contributing to the practical operation of the machine.

COMPOUND DOUBLETREE.—John Wykoff, Grant City, Mo.—The object of his invention is to obtain a more equable draft for the three animals and to operate advantageously in other respects. It consists of a double tongue or shafts within which the middle horse works, he being hitched to a singletree, which is attached by a pair of chains, or the equivalent thereof, to the inner ends of doubletrees which overlap each other, and are provided at their outer ends with singletrees for the outside horses. The doubletrees are pivoted to the tongues or shafts or to a splinter bar affixed across the tongues or shafts.

SCREW PLATE.—John S. Dutton, Jaffrey, N. H.—The object of this invention is to provide a convenient means for cutting any number of screws of equal size with the ordinary screw plate. This is accomplished by means of a gage collar which is movable on the screw which closes the dies, and which is further provided with a set screw to affix it at any point on the said screw, and thus limit the movement of the screw in closing the dies. Suitable marks or indices are engraved on the collar and on the proximate reduced end of the screw plate against which the collar is in contact when the closing of the dies is stopped.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisements at $1 00 a line, under the head of "Business and Personal."

☞ *All reference to back numbers should be by volume and page.*

G. J. W. & Co, Pa.—We know of no glue which is used for uniting pressed horn. It is generally done by heating the horn while compressed.

H. G. B., of Ohio.—The Chapman patent for india-rubber blocks, for shaft couplings has we believe expired. The effort to obtain an extension was futile.

J. J. M., of Cal.—You had better send us a sketch and description of your improvement and we will examine. When you write dont fail to give us your full address.

C. C., of Oregon—We have mailed to your address one of our pamphlets about patents.

P. C. C., of Conn.—A licensee under a patent does not enjoy the right to surrender a patent for a reissue, but he is entitled to the same right under a reissue that he had under the old patent. You have confounded a reissue with an extension of a patent, which are very different proceedings.

P. H., of N. Y.—Judge Curtis decided in 1855, that one owner in common in a patent has as good a right to use and to license others to use the thing patented as the other owner in common has. This we believe covers the point of your inquiry.

E. P., of Ill.—The Tucker bronze is not properly speaking a bronze. It is iron finished so as to resemble bronze. We do not believe it excels other bronzes. The color does not permeate the mass, it is a surface finish.

J. C. M., of Ga.—Horns are marketable, and are employed in the arts for many purposes, which we have not space to specify. A letter addressed to T. Gilbert, dealer in horn, 248 Front street, N. Y. city, will will probably secure all the information you desire.

S. and C. B., of N. Y.—Any cheap varnish that will dry hard is good to fill up the grain of open woods, so as to get a good surface for varnishing. There is a patent filling used by coachmakers which has been highly spoken of but we do not know its composition.

J. McC., of N. J.—The trouble in your case is that it is hard to melt thin sheet copper by itself without oxidizing the metal, which renders it very brittle. We advise you to condense the copper into a solid mass as nearly as may be, before you attempt to melt it. Then cover it with powdered charcoal and cover the crucible tight before applying the heat.

A. M. L., of Minn.—Everything else being equal the increasing the size of the discharge pipe of a force pump will not increase the pressure upon the valves, or increase the power necessary to drive it. Neither will it make any difference whether you discharge into the tank at the bottom or the top. The measure of the force required will be in either case the weight of the water multiplied into the hight to which it is raised.

A. M., of N. Y.—Meerschaum, is a hydrated magnesian silicate, found in serpentine veins in various parts of Europe. The pipes are made by carving, or by pulverising the substance, forming a paste of it, molding, and drying. The Turks formerly made pipes by the latter process but we think the Germans were the first to carve pipes out of the native material.

G. H. C., of Iowa.—The best cement we know of for general use is made as follows:—Isinglass, 2 drachms; soak 24 hours in 2 ounces of pure water; boil it down half, add 1 ounce of rectified spirit, and while it is hot strain through linen. Next melt one drachm of mastic and ½ drachm of gum ammoniac in 1 ounce of rectified spirit; add the latter solution to the first and mix thoroughly. This may be used for joining almost anything that is broken, but is too expensive to be used as a substitute for glue where the latter will do as well. In cementing, warm the edges of the articles to be joined, and spread the cement over as thinly as will cover the entire surface. Most people use too much.

W. W. T., of R. I.—"In looking over your paper for rules for gearing up screw lathes, I find none for the old fashioned lathes with four gears. If there is such a rule perhaps some of the readers of the paper will furnish it. In our shop there is such a lathe and the only way to find the gears is to guess and then figure, and continue until we find the right number." What an "old fashioned lathe with four gears" is we do not know. Ordinary lathes with back gears, whether furnished with a screw or not, have four gears, but not for screw cutting particularly but for reducing speed. If our correspondent means that his lathe has a screw and a change of gears numbering only four, we should suppose that the highly exact method of "guessing and figuring" would not give a very great range of threads that might be cut. Three gears are usually sufficient to cut a screw; one on the live spindle, one on the leading screw, and one intermediate. The rule is so simple it would seem to be hard to go astray: Divide number of threads in proposed screw with the number in leading screw, and the quotient and 1 compared give the relation between the two gears required. Thus: leading screw, 4 threads to the inch; proposed screw to be cut, 12 threads; 12 divided by 4 equals 3. Or, assume a number for a multiplicand, using the number of threads as multiplier; thus: assume 6; then 6 multiplied by 4 equal to 24 which is one gear. 6 multiplied by 12 equals 72 which is the other. In either case the relation of the teeth of the gears is as 3 to 1. Of course the intermediate gear may be of any size so it connects the two; as the rule is "a tooth for a tooth."

J. P. W., of Mass.—Hair cloth is made in this country. The warp is either cotton or silk, and the filling hair from horses' tails. The width of the cloth is governed by the length of the hairs, they being assorted for that purpose.

H. & Co., of Pa.—We can recommend nothing as equal to the hair felting, now extensively used, as a "covering for steam pipes to prevent condensation." As a non-conductor it is as nearly perfect as any material or method with which engineers are acquainted.

P. McK., of N. J.—Your acknowledgment that the force of the blow of your favorite, the trip hammer, depends largely on a spring admits our position and confirms the statements we made on page 196 current volume.

C. W. T., of S. C., is an apprentice in the Phœnix Iron Works, Charleston, and asks what he should do to become a first class engineer (probably mechanical); and why there is no power gained by the use of the lever. We are always willing to reply to requests from apprentices for information, although we must repeat our instructions not unfrequently. To become a first class *anything* requires attention to the details of the business, a practical acquaintance with it, a knowledge of its principles—the why and wherefore—and untiring perseverance. All these the apprentice can acquire and do. Get a school book on natural philosophy and it will answer your second question and aid you greatly in your business.

T. W. H., of N. Y.—"If two boilers connecting by tube and stopcock, one containing atmospheric air and the other steam and water, are heated so that each one shows a heat of 200° Celsius, the one containing the atmospheric air heated, however, with valves opened for the escape of air so that *no pressure* is generated. If then at 200° Celsius the valves are closed and the stopcock is opened what will be the temperature, density, and pressure per square inch of the mixture, and what proportion of the whole space, will be occupied by the steam and what by the air, supposing the water contained in the one boiler at the time of opening the stopcock to have occupied one tenth of the whole space? What will be the effect of opening the stopcock upon this water, no loss or gain of heat to be supposed by exterior causes?" Air can be expanded seven volumes by heat, but if the reservoir of air in this case is left open until 200° Celsius or 390° Fah. is reached, there will be very little air left in to resist the steam in the other boiler when the communication between the two is opened—the air may as well be left out of consideration. The 390° Fah. in the steam boiler will give a pressure of 210 lbs. per square inch.

J. T. G., of Mich.—"I have a tubular boiler 60 inches by 12 feet, with 90 3-inch tubes and very large steam dome. The boiler foams considerably, and I would like to know the best way to stop it. The engine is low pressure, cylinder 22 by 24 inches, 72 strokes per minute, working at 45 lbs. pressure. What sized holes shall I put in a plate to be placed in the steam dome?" If the boiler is upright, place in the dome a capped cone of sheet metal (in form like a thimble) perforated with holes of from one eighth to one quarter inch, sufficient in number to have their combined area equal one third the area of the steam pipe that supplies the cylinder. Let this capped cone, or cylinder be small enough to have its walls at least an inch from the inner walls of the dome. If the boiler is horizontal introduce a plank of wood through the manhole and hold it by wires under the dome allowing it to float on the water surface at the low water level. Either of these will prevent foaming; but we think the boiler is insufficient for the engine if its full power is developed, and this would cause the foaming, as the rapid taking off of steam would mechanically lift the water and cause foaming.

Business and Personal.

The charge for insertion under this head is one dollar a line.

NEW PUBLICATIONS.

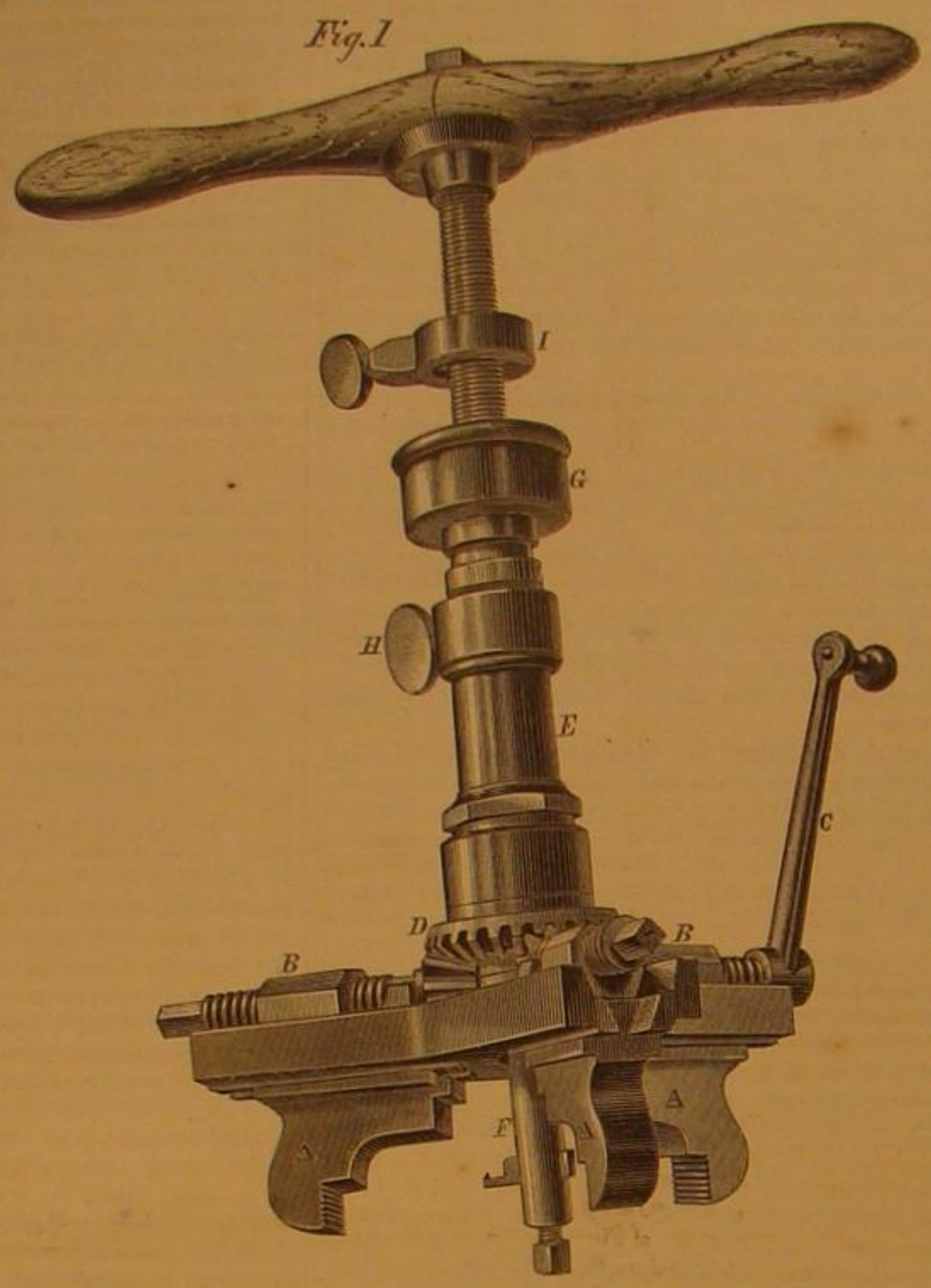
BEECHER'S SERMONS,

Week by week as they are delivered, are now in course of publication by J. B. Ford & Co., 164 Nassau street, New York. Terms $3.50 per annum, pamphlet form.

Improvement in Hand Machines for Boring Wheel Hubs.

The large engraving is a perspective view of a self-centering hub borer, which adjusts and holds the hub in position while being bored, and forms a square shoulder in the hub at the bottom of the bore. The chuck frame consists of three equidistant radial arms, having dovetailed slots in which slide the jaws, A, having corrugated grips or faces for engaging with the surface of the wheel hub, and holding it firmly. That portion of the jaw that projects above the radial arms is a nut, B, in which works a screw, the outer end of which is squared to receive a wrench, C, and the inner end carrying a beveled pinion engaging with a bevel gear turning loosely on the shank of the spider or jaw frame. By this means, whichever screw is turned, the two others, by the medium of the pinions on their ends, and the central gear, must have a common and simultaneous movement. Thus the jaws will be advanced to or receded from the center in perfect accord, and bring the center of the hub exactly coincident with the center of the machine.

Fig. 1



That portion of the jaw chuck above the wheel, D, is screwed to a stock, E, both being hollow to receive a boring mandrel, F, carrying a cutter at its lower end. The upper portion of this mandrel is threaded with a screw of about ten to the inch, sufficient for ordinary feed for wood cutting, and has a handle similar to that of an auger. The feed nut, G, with which the mandrel thread engages is of peculiar construction. It is seen plainly in Fig. 2. The nut is in two halves, A, which slide in a dovetail slot cut across a circular bed piece, B. The whole is covered by the cap, Fig. 3, and the half nuts are moved to or from the screw by a pin or screw in each projecting into semi-spiral slots, A, in the top of the cap. Pins on the lower portion of this cap are seated into an annular channel on the boss of B, Fig. 2, so that the cap may be turned without lifting from place. This combined nut and cap is held in place in the stock, E, when the machine is in use, by a thumb screw, H, Fig. 1, that fits in an annular groove on the shank of the circular bed piece or block, B, Fig. 2.

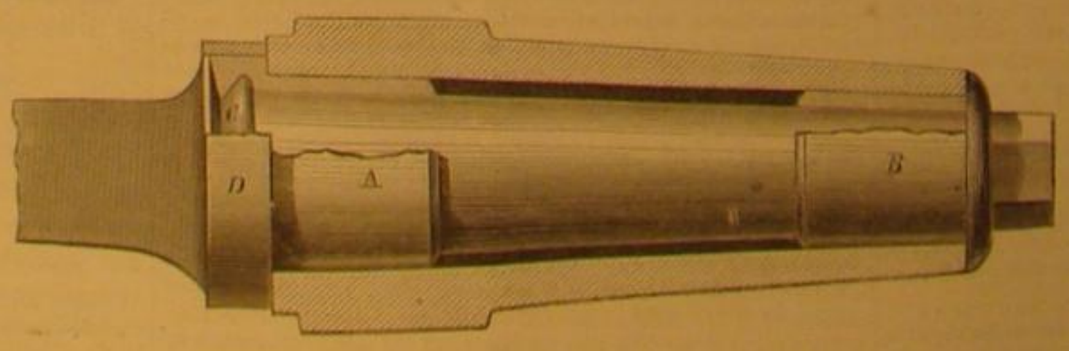
Fig. 4 is a gage for determining the depth of the hole to be bored; seen also at I, Fig. 1. It has an oblong hole, a portion of its interior being threaded to fit the screw of the mandrel; and on the opposite side is a gib, also threaded on its end, fitting in a chamber, and moved to place by a thumb screw. These opposite threaded portions prevent injury to the screw of the mandrel when the gage is set up.

When a hub is to be bored, the gage is secured on the mandrel at a proper hight above the cap of the feed nut, to bore the required depth of hole in the hub. The hub being held in the jaws, the mandrel is turned, the tool being fed by the feed nut at the top of the stock, E, until the gage comes in contact with the cap of the nut. The set screw, H, is then slightly loosened, which permits the feed nut to turn with the mandrel, and a few turns of the handle forms a perfectly square shoulder at the bottom of the hole. To withdraw the mandrel from the bored hub, it is only necessary to give the cap of the feed nut a slight turn to the left, separating the two halves of the nut, when the mandrel can be lifted out.

Patented August 11, 1868, antedated July 25, 1868, by A. R. Silver, assignor to himself and John Deming. Address Silver & Deming, Salem, Ohio.

Improved Carriage Wheel Axle and Box.

The object of this invention is to decrease the friction of the hub, or the sleeve of the hub, on the journal of a carriage axle and at the same time to strengthen the arm at the shoulder. Instead of boring the sleeve on a taper and turning the arm to fit (always a difficult job, and never reliable when subjected to wear), two bearings, A and B, are cast on the arm. These are of anti-friction metal, Babbitt, or brass composition, forming a part of the arm and making a clean bearing for the sleeve of the hub. The coating or anti-friction metal may be secured to the arm either by scores or corrugations or held in place by a raised bead or annular ring, as at of This may be further strengthened by a ring C, wrought iron, D. In the engraving, portions are shown in section and other portions in perspective, so there can be no misunderstanding of the device. It will be seen that the necessity of turning the arm and boring the sleeve or box its whole length is dispensed with, and the work of fitting as well as the amount of friction considerably less-



GARTH'S PATENT CARRIAGE AXLE BOX.

ened. Patented through the Scientific American Patent Agency, Sept. 1, 1868, by G. S. Garth, whom address for additional particulars, at Mill Hall, Clinton Co., Pa.

"Do Steamers Run Above Omaha?"

What a question for the President of a New York Bank to put! Yet he so inquired of a friend of mine the other day, who is in the banking business at Omaha, and does his eastern portion of it through this same New York bank. And the moneyed man, who knows Wall street so well, and probably Liverpool and Canton, did not know, that from Omaha, steamers run up twenty-three hundred and sixty-eight miles to Fort Benton. If he had stood on the levee at Omaha the other day he would have seen the steamer *Success* come down that long run, and round to, with $300,000 in treasure.

When will eastern capitalists, and politicians, and Christians, learn where and what the West is? Some seem to think that it is the Holland Purchase, or Genesee country, or at the farthest, Ohio. Ohio is "down east" to a western man. Our ideas of the national domain are sadly dwarfish. The growth of them has by no means kept pace with our increase. The Louisiana purchase in 1803 for $15,000,000; the Florida purchase in 1819 for $3,000,000; the annexation of Texas in 1845; the California, New Mexico and Utah purchase in 1848 for $15,000,000; the Arizona purchase in 1854, for $10,000,000, and the Russian purchase for $7,500,000, were purchases that would have bought out central and southern Europe and the British Islands. A provincial eastern mind has no tolerable conception of the magnificent distances that measure and bound these regions. The banker asked an innocent question, not dreaming that an American can run between the banks of one of his own rivers more than three thousand miles on a steamer up the Missouri.

. . . . . .

Steamers above Omaha! Why, man of Wall Street, after a steamer has run three hundred and fifty miles above Omaha, on the Nebraska shore, she runs on somewhat diagonally across Dakota Territory (as large as seven Empire States, as large as forty Bay States), and then is nine hundred miles below Fort Benton, where the *Success* took on board your $300,000 in treasure.

And as vast as these distances, and territories, and steamboat excursions seem, to one going West, the idea is to be taken into an Eastern mind, if possible, that our geographical center for the national domain, is a long distance beyond the head of steamboat navigation up the Missouri, that being thirty-one hundred and seventy-five miles above St. Louis. Our present center is near the mouth of the Columbia on the Pacific, measuring from Eastport, Maine, to the extreme western Aleutian Island in our Russian purchase. If one would measure the whole, by two Titanic steps, starting from Eastport, his dividing footprint would rest somewhere about John Jacob Astor's old Astoria. Our extreme northern limit, Barrow's Point, is seventeen hundred miles farther north of this in its latitude, as well as being so much farther west. About one third of the circumference of the globe is now spanned by our territory!

When the Englishman boasted to the Indian that the sun never sets on British soil, the Indian replied: "The Great Spirit no trust Englishman in the dark." It certainly is to be hoped that our pride will not swell with our domain, or our spread eagle sprain his wings by stretching them to our two extreme limits in some national flutter.

The mileage now drawn by the delegate in Congress from Washington Territory is about $11,000 for each session; for a delegate from New Archangel it must be at least $20,000; and when one shall come down from Barrow's Point to represent in our national halls his polar bear and walrus constituency, his mileage must go vastly above a score of thousands.

I cannot compute it exactly, as Mr. Seward has not made known by what sledge path and line of kayacks, the Esquimaux delegate shall take his route to Behring's Strait, and Sitka. Lively work in politics, no doubt, the mileage and pay will make among our Esquimaux citizens, and will give us in Washington politicians more oily, if possible, than we now have there.

"Do steamers run above Omaha?" And Eastern ideas are quite as crude about the growth and population, and power of the West. Indians, log cabins, immense forests, clearings, and vast prairies, as many suppose, are the "far West," out beyond Buffalo and Chicago. They cannot realize that if all the population of New England were dropped from the census, it would not reduce it one tenth, nor can they imagine how the entire area of New England could be taken out of Minnesota, and yet leave land enough for four States and over like Connecticut.

Fig. 4

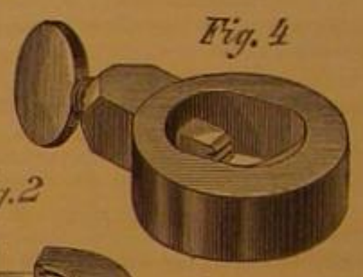
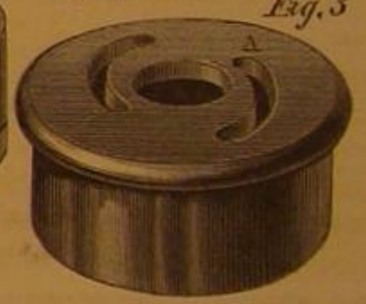


Fig. 2

Fig. 3



SILVER'S PATENT HUB BORING MACHINE.

Still fainter is the Eastern conception of the growth of the West. In the fall of 1840 I shot quails in the streets of Quincy, Ill. In April 1867, I met in the theological hall at Chicago, to whom his liberality gave the name, Dea. Willard Keyes, one of the log cabin founders of Quincy, now a populous, wealthy, and powerful city. In the spring of 1841, I spent two days at Keokuk, Iowa, a village of twelve log and two frame houses. In these it had thirteen groggeries, and a motley population of Indians, half-breeds and whites, perhaps a hundred in all. Now, Keokuk has a population of about 15,000, twelve churches, three daily papers, a medical college and two or three classical schools. Its main street is about a mile long, having many substantial brick blocks for banks, offices, hotel, etc. One railroad connects it with Des Moines, the capital, one runs around the rapids and up toward Muscatine, and one East connecting the city with leading points in Illinois.

About the same time I visited Davenport, Iowa. Then the place had a population of about six hundred, and few farms were opened beyond Duck Creek, four miles west. Now it has twenty thousand or more people, with a score of churches, splendid hotels, theaters, banking house, and private dwellings that are princely. Beyond Duck Creek now it is farms, cities and railroads four hundred miles to Council Bluffs, opposite Omaha. From Omaha the Pacific railroad is running at the rate of three miles a day, and has already gone about eight hundred miles.

Yes, steamers run above Omaha, and it would be a good thing if the heads of some of our Eastern financial and political and religious organizations would take passage on them.—*Correspondent of Congregationalist.*

The California laurel wood is growing in favor for cabinet and ornamental manufacture. Its color is peculiar but very handsome, and it is said to take a most beautiful polish. It has a charming neutral tint which softens the glare of bright colors, and increases the depth of subdued hues.

Scientific American.

MUNN & COMPANY, Editors and Proprietors.

PUBLISHED WEEKLY AT
NO. 37 PARK ROW (PARK BUILDING), NEW YORK.

O. D. MUNN, S. H. WALES, A. E. BEACH.

☞ "The American News Company," Agents, 121 Nassau street, New York.
☞ "The New York News Company," 8 Spruce street.
☞ A. Asher & Co., 20 Unter den Linden, Berlin, are Agents for the German States.
☞ Trubner & Co., 60 Paternoster Row London, are also Agents to receive subscriptions.
☞ Messrs. Sampson, Low, Son & Marston, Booksellers, Crown Building 188 Fleet street, London, are the Agents to receive European subscriptions or advertisements for the SCIENTIFIC AMERICAN. Orders sent to them will be promptly attended to.

VOL. XIX., No. 17...[NEW SERIES.]....*Twenty-third Year.*

NEW YORK, WEDNESDAY, OCTOBER 21, 1868.

Contents:

(Illustrated articles are marked with an asterisk.)

A CAUTION.

We warn our clients and inventors, generally, to pay no attention to circulars sent out by irresponsible parties, at Washington, offering to put through their cases prior to regular official action. Agents who resort to such practices, prowl about the Patent Office, and in some improper manner obtain the name and post-office address of the applicant, knowing all the while that they are violating a sacred trust, and are liable to have their names stricken from the roll of attorneys, in accordance with section 8th, of the laws of 1861. Commissioner Foote would undoubtedly exercise this prerogative, if such cases of violation were properly brought to his notice. We have now before us a case of our own. The application was duly filed, and all the fees paid. Pending the application, a firm in Washington, composed of several names unknown to the profession, sent a power of attorney to our client, who unwittingly signed it, supposing that it was necessary for him to do so.

The patent was allowed on our application, some days before the second power of attorney reached the office. Still the humbug agents took possession of the letters patent, and are demanding fees for having done nothing whatever about the case. Inventors should be very cautious about sending powers to these prowling agents.

CHANGES IN THE ELEVATION OF LAND.---SUBSIDENCE OF COASTS.

OUR attention has been attracted to this subject by an article that recently appeared in the New York *Times* giving some statements in regard to evidences of a gradual subsidence of the New Jersey coast, especially the lower section of the State. Speaking of the facts which seem to sustain the idea that for many years there has been a gradual sinking of the land the writer says:

"One of the most marked of these is the diminution of efficiency in various mills located in or near the tide waters. The owner of a tide-mill near Beesley's Point, in Cape May County, has attended this mill himself since 1826, and during all the intervening time there has been no change in the raceways or the arrangement of the wheel. He is positive that he has lost four inches of head, if not more, by the increased height of low water.

"A pond-mill on West Creek, built in 1805, with its wheel-pit floor carefully set as low as possible so as not to be affected by the tide, which flows up to it, and which has not since been altered, was only affected during extraordinary high tides, produced by storms. Now it is stopped twenty times a year by common perigee tides; and a careful observer in the neighborhood believes that the tide rises twelve if not fifteen inches higher on the wheel than when the mill was first built.

"A saw-mill on Sluice Creek, built in 1757, was originally beyond the reach of its usual height of the tide, when at present the high tides reach half way up the mill-dam, and the mill is only run by having a dam and sluice some distance below. The owner thinks the tides rise an average of two feet higher than when the mill was first erected. These facts show that there has been a perceptible change in the relative level of the land and water within the memory of men now living."

It is to be noticed that these cases are not to be counted among those where the wash of the surface has undermined the land and swept the earth away; only the peaceful action of the tide could have abraded the land. But it would seem that a gradual sinking of the land, or as gradual an uprising of the sea level must have produced these results. The former appears to be the most probable hypothesis, as in the latter case the effect would have been general rather than local. These facts show that the forces which in former ages produced those changes, the results of which even now excite our wonder, are still in operation, although, perhaps, in a limited degree. A remarkable evidence of the change in the relative level of land and sea is afforded on the shore of the Bay of Fundy, a few miles north of Yarmouth, Nova Scotia. Here, at a distance of at least a quarter of a mile from the beach, are the distinct water marks of a former sea level. A line runs along the face of the ledge, well defined, and below its level minute sea shells, and even petrified kelp we have found in the interstices of the rock. Now the limit of the waters of the bay, even at the highest tides, is distant from the ancient sea level at least twelve hundred feet, which is a gradually shelving plateau of sand, shells, gravel, and stones, unproductive of any vegetation except a few patches of sedges. The absence of soil would seem to denote that the change in land level here was comparatively modern, and the beach and land intervening between the present and former water line, being composed of the same materials as the sea bottom, seems to indicate that the bottom has been exposed either by its rising or the subsidence of the water.

We remember, when a boy, fishing in a little estuary of Narragansett Bay under the shadow of a grove, the trees of which grew within a few feet of the high tide line, so near that when landing, the boat's "painter," some fifteen feet long, was usually tied to one of the trees. When last there, the water line had receded from the trees about fifteen feet on a shelving shore, the relative level of sea and land having changed at least twenty inches in about as many years. Curious to know the reason, and believing the wash of the rains had gradually filled the bed of the estuary, we tested the matter by a simple experiment. There was a flat submerged rock, about forty feet from the shore, on which, at high tide, there was about four feet of water. Now there was, at the same state of the tide in the same month of the year, by measurement, only twenty-eight inches of water on the rock. No accumulation of sand washings could have produced this result; the bottom of the estuary had risen or been lifted up twenty inches in twenty years.

The changes made by the washing of the surf in gradually undermining and encroaching upon the land are noticeable on almost all exposed shores unless guarded by cliffs of stone. Many of our seaside watering places give marked evidences of such encroachments. Summer seats which a few years ago possessed fruitful gardens or verdant lawns sloping toward the water, have lost these pleasant appendages, and in some cases the sites of the houses have been threatened, if not made dangerous, by these encroachments. The writer from whom we have quoted says, further, in relation to these encroachments on the coast of New Jersey: This wearing effect of the waves is especially visible in the Southern part of this State. On the Atlantic shore of Cape May County sand-banks from fifteen to thirty feet high, and many of them covered with living trees, have been washed away, and their places supplied by flat and sloping sands. In some sections they wear away more rapidly than in others. Dr. Leaming and other residents of the vicinity think that the Seven Mile Beach opposite Seavile has worn away one hundred yards during the past twenty years.

The shore in front of the boarding-house at Cape Island must have worn away nearly a mile since the Revolutionary War. This is the opinion of Mr. Ezekiel Stephens, whose father resided upon the spot. During the Revolution a militia artillery company used to practice firing at this point. Their gun was stationed near a house which stood just beyond the present shore line, and their target was full three-quarters of a mile east. Beyond this beaches extended for nearly a quarter of a mile before reaching the sea-shore. The sea has washed away the whole of this ground, and one of the boarding-houses has been removed twice to escape being swept away. Within a few years the bank has been protected by a covering of cedar brush, and the wear has not been so perceptible.

A remarkable evidence of the wearing of the bay shore of the county is related. The grandmother of Aaron Leaming was buried in 1794, at Townbank, in a graveyard some distance inside of the town. In 1734, the graves were about fifty rods from the shore, and ruins of the houses were apparent. Now the graveyard has all been washed away, and at dead low-water mark, the mark of three wells, remnants of the town built between the shore and the graveyard, can be seen. Mr. Price, a surveyor in the vicinity says his lines are shorter by forty or fifty rods, than they were in 1776.

Dennis Creek is said to have lost more than a mile of its length by the wearing away of the marsh at its mouth, within the last seventy years. A single storm will sometimes wash away several rods of the marsh. In 1852, a human body which had washed ashore, was buried forty rods from the shore, near the mouth of Dennis Creek. Three years after the shore was found washed away quite up to the coffin, which was exposed. Mr. Smith, a surveyor, believes that the shore for three-fourths of a mile in breadth has been washed away the whole distance between West and Dennis Creeks in Cape May. Similar facts are attested respecting the shores of the Delaware Bay and River in Salem and Cumberland Counties.

THE pictorial publications have illustrations of the recent earthquake of course "taken on the spot." A friend of ours who has seen the real thing several times, says the artists' hands appear to have been altogether *too steady*.

WELDING---NATURE AND MEANS OF THE PROCESS.

Welding, as usually considered, is the uniting of two pieces of iron or steel by the combined means of heating and compression, or by either of these alone. In the welding of wrought iron the two portions to be united are brought to a white or welding heat—a state of incipient fusion—in a furnace or forge, and then united by being brought in contact, and subjected to percussion by the hammer, or to compression by rollers or dies. This is the usual style of welding.

Welding, by heating alone, is used in repairing broken castings of iron, and also for uniting cast steel and cast iron, as the faces of anvils united to a cast iron block, or the edges of shears and scissors to the iron stock. It is performed, in the first instance, by placing the mass of cast iron in a mold with a cavity formed by the broken piece, used as a pattern, and then replaced, a free gate being made from the point of fracture or intended union. The melted iron is poured in and allowed to flow through, until, in the judgment of the operator, the two surfaces are brought to such a state of fusion as will suffice to unite the parts when the gate is closed, and the iron allowed to rise in the sprew. The method of uniting cast steel and cast iron is similar, and the results are the same.

Welding, by compression alone, is, so far as we know, the result of accident, although why it might not be utilized we cannot see. It may be witnessed sometimes in the case of turbine water wheels, or other heavy machinery supported on upright shafts, the weight of which is sustained by two or more washers of steel or iron. The weight, combined with the friction, unites the disks so firmly that we have seen cases where they could not be separated by any ordinary mechanical means.

The object of heating is to soften the substance, or rather to separate its particles, thus allowing room for the reception of the particles of the other piece to be joined. In fact, it is a partial fusion of the metals, which forms a union of their particles in the same way as in melting and casting, except in the former case compression is necessary to complete the work. Although we speak of percussion, rolling, and pressing, as comprehended under the general term of compression, one method may have a great advantage over another under certain circumstances. For instance, we examined, the other day, a steel bit for a horse's mouth, having a large steel ring at each end made of quarter inch steel wire. It was impossible to see where these rings were welded, although the weld was only a but or jump weld—the parts in contact being only the cross section or diameter of the wire—and the only means of hiding the joint was the finish received by the rattle box or tumbling barrel. The method used was to coil the wire on a shaft of suitable size, as in winding a close coiled spring, and then sawing longitudinally across, separating each coil into a ring. This was passed through the hole in the head of the bit, and the ends of the ring heated to a low red only. Then the ring and bit head was laid into a recess in the matrix or stationary die of a press, which was slightly smaller in diameter than the unfinished ring, and a corresponding die was brought down upon the ring, not dropped, but with a gradual squeeze. With only this slight heat, but with the compression, extending around and exerting its force on every portion of the ring, the result was perfection itself. This style of work is done by some concern in New Haven, Conn., the name of which has escaped our recollection. It would seem that this process might be economically applied to the manufacture of chains, elegant in appearance and of unusual strength. It appears that the union of the parts in a weld is effected more by the compression of the parts than by the heating. Blacksmiths understand this when they require the blows of two or more sledges to make a weld. It may be mentioned that clean surfaces are necessary, as the least amount of oxidation impairs the efficiency of the weld. The use of a flux, as borax or sand, etc., is mainly to protect the parts from the oxygen of the atmosphere.

HORACE GREELEY'S RECOLLECTIONS OF A BUSY LIFE.

This book is a reproduction of a series of autobiographical papers published in the New York *Ledger*. We presume nothing of the kind ever published in this country has been more extensively read than these papers. The book before us has, however, important additions of miscellanies from the pen of its gifted author, and the celebrated discussion of the law of divorce by Mr. Greeley and the Hon. Robert Dale Owen, as it appeared in the *Tribune* during the spring of 1860.

The lives of distinguished men have always been considered as profitable studies, and when written by themselves they are specially so. All men have their faults and weaknesses, and though self-knowledge is ever earnestly sought by all really great men, none ever attain to such perfection that some defects, some unvanquished tendencies do not remain. Such faults of character, apt to be glozed over by biographers, display themselves when a man attempts to tell his own story. We have read Parton's "Life of Horace Greeley," and while we admire the singularly felicitous style which has made Mr Parton so justly popular as an author, we still think no better illustration of the superior value of well written autobiography could be given than is obtained by a comparison of his book with that of Mr. Greeley. Autobiography is necessarily tinged with egotism; nevertheless there is always a piquancy in personal narrations which is lost when they come at second hand. These "Recollections" have the full flavor of Mr. Greeley's personality; after a perusal one feels like an old acquaintance.

We have never been a believer in the infallibility of Mr. Greeley's judgment or philosophy; but we do believe in his earnestness, his honesty, his power, and if no other lesson

could be learned from a perusal of the story of his life than the value of these most essential qualifications for highest success, it would a thousand times repay perusal. Casually opening the volume, almost the first thing which catches our eye is the story of the author's first attempt at smoking. "A number of half smoked cigars had been left on the mantel, and some evil genius suggested to us tow-headed urchins that it would be smart and clever to indulge in a general smoke. Like older fools, we went in, and I was soon the sickest mortal on the face of this planet. I cannot say as to my comrades in this folly; but that half inch of cigar stump will last me all my life, though its years should outnumber Methuselah's. * * * * * From that hour to this, the chewing, smoking, or snuffing of tobacco has seemed to me, if not the most pernicious, certainly the vilest, most detestable abuse of his corrupted sensual appetites whereof depraved man is capable."

This incident, and the language in which it is told, are characteristic of the man. His convictions are never halfway, and for that reason his language is strong. It is born of earnestness, the parent of strength in all things. Horace Greeley is a strong man every way; strong in his likes and dislikes, in his opinions and prejudices. Mentally and physically his powers of endurance are such as to excite the admiration of all who know the amount of work he daily gets through. As a self-educated, self-made man, he ranks with Franklin, although the two men differ widely in some respects. Their tastes exhibit many points of contrast, while their habits of life and general views of affairs have many resemblances. Greeley is a philanthropist, and a genial kind-hearted man, who yet has the nerve to apply the scourge to any one whom he esteems a willful wrong-doer. His pen is a lash of scorpions, when his ire is aroused. As a vigorous, caustic, and humorous writer, he has not his equal on the American press. His humor is of the quiet sort, the most effective of all styles. Take this example from his description of a night ride of forty-three miles on a hand car over a Western railroad: "I only tried my hand at propelling for one short mile, and that experience sufficed to convince me that, however it may be as a business, this species of exercise cannot be conscientiously commended as an amusement." Or this: "I presume if I ever were to have the week I covet I should find it insufferably tedious—the musketoes biting superbly; the trout shyly, or not at all—and should long for a return to civilization, with its hourly toils and struggles, its thronged pavements, and its damp newspapers with breakfast." Or this: "I conceive it all but an axiom, that he who asks a stranger to lend him money will never pay it; yet I have known an exception. Once, when I was exceedingly poor and needy, in a season of commercial revulsion, or 'panic,' I opened a letter from Utica, and found therein five dollars, which the writer asked me to receive in satisfaction of a loan of that sum which I had made him—a needy stranger—on an occasion which he recalled to my remembrance. Perplexed by so unusual a message and especially by receiving it at such a time when every one else was seeking to borrow—no one condescending to pay—I scanned the letter more closely, and at length achieved a solution of the problem. The writer was a patient in the State lunatic asylum."

The book is interspersed with just such gems of humor, as these we have quoted, from each of which a lesson of instruction as well as a hearty laugh may be obtained. As a moral tonic we have seldom seen a book that we would more readily place in the hands of a family, or one that we should expect to see sooner well thumbed.

Photographing the Sun during the Total Eclipse.

The *Augsburg Gazette*, of September 13, contains the following extract from a letter written by Dr. Hermann Vogel, who accompanied the North German expedition to Aden, as a photographer:

"At four o' clock, on the 18th of August, we left Aden, where the expedition had established its head-quarters. Nine-tenths of the sky was overcast, and we endeavored to feel as resigned as possible to our probable disappointment. Our object was to obtain as many photographs as could be taken of the phenomena during the three minutes they would last, and in order to do this we had practiced with our machine, like soldiers with fire-arms. Dr. Frische was charged with the preparation of the plates, Dr. Zenker with putting the slides into the machine, Dr. Therle with drawing them out when they had been exposed a sufficient time, while my business was in the tent. With this division of labor we found that it would be possible to obtain six photographs in the three minutes. As the important moment approached, to our delight we saw, through a break in the clouds, the disk of the sun partially covered by the moon. The landscape around us assumed a strange hue, neither sunlight nor moonlight—the chemical color rays were exceedingly weak. As a test, we exposed a plate in the machine for fifteen seconds, and obtained a good impression of the clouds; as the disk of the sun grew smaller, the clouds opened out. The last minute before the total eclipse arrived, Dr. Frische and I crept into our tent—our work began. The first plate was experimentally exposed five and ten seconds, in order to be sure of the right time. Mahommed, our black servant, brought me the first slide into the tent. I prepared the plate, and anxiously watched to see what would appear. Just then my light went out. I rushed out of the tent with the plate in my hand, and came back with a small oil lamp, which, in case of accidents, I had placed on a table outside. Eagerly I gazed on the plate—the dark border of the sun was surrounded on one side by peculiar protuberances, and on the other was a remarkable horn. The phenomena were the same in both pictures. My joy was great, but I had no time to indulge in it. The second plate, and, a moment afterwards, the third plate, were brought into the tent. Dr. Zenker shouted to us that the sun was reappearing. The total eclipse was over. The last two plates only showed slight impressions of pictures, as they had been spoilt by the clouds, which, while they were exposed in the machine, had closed in. The three plates showed protuberances on the lower border. We washed, fixed, and lacquered our plates, and took several copies of them on glass, which will be sent separately to Europe in order to insure their safe arrival."

Total Eclipse in 1869.

Asia it seems is not to enjoy a monopoly of total solar eclipses. It is announced that a total eclipse of the sun, visible in the United States, will occur in 1869. The sun will rise eclipsed in the interior of Siberia, on the morning of August 7, 1869, whence the shadow will move in a northeasterly direction; then, turning eastwardly and southwestwardly, will pass over Behring's straits and northern Alaska at noon, local time. Thence, moving across part of British North America, it will re-enter the United States in Montana, between 2 and 3 p. m., local time. Moving thence across Western Nebraska, it will pass diagonally through Iowa, passing over Sioux City, Des Moines, and Keokuk, about 5 o'clock. Thence it will pass still to the southeast, over Jacksonville, Illinois, across Southern Indiana, Central Kentucky, Eastern Tennessee, into and across North Carolina, and will touch the sea coast in Pamlico sound; and will finally leave the earth not far from the Bermudas. It will be visible in all parts of the United States, and total over a belt about 100 miles wide along the line just indicated, the sun being hid more than four minutes.

Editorial Summary.

Cigar Making by Machinery.—The Bright's American Cigar Machine, patented through the Scientific American Patent Agency, was exhibited a few days ago at 171 Broadway, New York City, to members of the press and experts On an examination of the machine (or machines, for there are several) and the operations, we must confess we were favorably impressed with the feasibility of producing good cigars, of equable smoking properties, by means of these machines, which resemble in size, portability, and finish the ordinary sewing machine. The rapidity of the processes, and the perfection of the result seem to promise an early and general introduction of the process and the machines, which may be driven by foot, hand, or steam power. Manufacturers of cigars or chewing and smoking tobacco would do well to examine this machinery.

Hindoo Writing.—Writing is a curious art as practiced by the Hindoos. They may be often seen walking along their native streets writing a letter. An iron stile and a palm leaf are the implements. In writing neither chair nor table is needed, the leaf being supported on the middle finger of the left hand and kept steady with the thumb and forefinger. The right hand does not, as with us, move along the surface, but, after finising a few words, the writer fixes the point of the iron in the last letter, and pushes the leaf from right to left, so that he may finish the line. The characters are rendered legible by besmearing the leaf with ink-like fluid. A letter is generally finished on a single leaf, which is then envolved in a second, whereupon is the address.

Joseph not a Carpenter.—The *Builder* says: "When the British Archæological Association were inspecting the gallery of the paintings at Charlton House, attention being called to the picture of Joseph working as a carpenter, assisted by the child Jesus, Mr. Black said he wished that Joseph had been represented in his proper business as a mason, the original term used signifying architect, builder, or mason, and not carpenter. The term carpenter, he urged, was undoubtedly an error, as in the climes where Joseph dwelt no wood was used in the erection of the structure of their houses but stone only."

Sale of Prof. Silliman's Mineralogical Cabinet.—We learn that the Executive Committee of the Board of Trustees of Cornell University have purchased the private mineralogical cabinet of Prof. Silliman, of Yale College. Prof. Silliman says of the cabinet, "My collection has been formed almost exclusively by my own personal exertions, during more than twenty years of active experience as a collector in the field, and by the system of exchanges instituted from an early day with the most active collectors both in America and Europe."

New Dye for Woolen Goods.—Tar water, it is asserted, may be employed for dyeing silk and wool with the color called *gris cendre*, or ash gray. The stuff is first mordanted with weak perchloride of iron, by soaking in the solution for some hours. It is then drained and passed through the bath of tar water. The oxyphenate of iron, which is thus precipitated on the fabric, gives a very solid color.

The North Star Gold Mine of Grass Valley, Cal., are exhibiting at the Mechanic's Fair some specimens of ore which are valuable as showing stratification in veins, thereby proving the impossibility of volcanic ejection in the filling up of those veins with quartz, pyrites, and gold.

The New York *Times* does not give us credit for the article upon "Solar Engines," which first appeared in the Scientific American, Sept. 16th. The translation was furnished to us by Mr. Delamater, and is the same in the *Times*, word for word, as it appeared in our columns.

OFFICIAL REPORT OF PATENTS AND CLAIMS

Issued by the United States Patent Office.

FOR THE WEEK ENDING OCTOBER 6, 1868.

Reported Officially for the Scientific American.

PATENTS ARE GRANTED FOR SEVENTEEN YEARS, the following being a schedule of fees:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Reissue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay $500 on application.

☞ *Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to Inventors, may be had gratis by addressing MUNN & CO., Publishers of the Scientific American, New York.*

82,673.—Sheep-shearing Device.—J. K. Alwood, Delta, Ohio.

I claim, 1st, The bladed wheel, a a a, with its blades, K K K K, substantially as described, for the purpose specified.

2d, The semicircular protuberance, P, of the shear case, S, in front of the dotted line, d, with the fingers, v v, substantially as described, for the purpose specified.

3d, The combination or connection of the bladed wheel, a a a, with the cord wheel, Y, so as to receive motion therefrom.

4th, The combination of the several parts described, for the purpose of forming a cutting device for sheep shearing.

82,674.—Mode of Transmitting Motion.—Marcus M. Ammidown, Boston Mass.

I claim, 1st, The combination of the hub, a, and the cylindrical shell, d, provided with the eccentric, d', substantially as and for the purpose set forth.

2d, The combination, with the eccentric, d', of the pawl, e, and toothed wheel, f, substantially as and for the purpose specified.

82,675.—Axle Grease.—J. J Barrett, Chillicothe, Ohio.

I claim the axle grease compounded substantially as above described.

82,676.—Nozzle for Hose Pipe.—Oscar J. Backus, San Francisco, Cal.

I claim the combination, with a nozzle, throwing a single stream of water, the sprinkler, D, constructed and operated with the holes, E F G G, in the stop cock, and holes, C C, leading into the nozzle chamber, substantially as and for the purpose specified.

82,677.—Sadiron Handle.—Arad Barrows, Philadelphia, Pa.

I claim the cast sadiron handle, A, including the wires or rods, C C, constructed and arranged substantially as described, as a new article of manufacture.

82,678.—Slat Matting for Cars, etc.—William Barton, Troy, N. Y.

I claim a flexible slat matting, consisting of the slats, A, and flexible lines, B, the knots or protuberances for keeping the slats apart being formed by the said lines, B, as set forth.

82,679.—Nail-Cutting Machine.—W. H. Battelle, Youngstown, Ohio.

I claim, 1st, The arrangement of sliding nipper bar, A, provided with the spring nipper, F, the spring, C, cam, E, adjusting pin, e, and retractor, C' substantially as and for the purpose set forth.

2d, The arrangement, with the feeding guide, N, of the slide, U, rod, T, weight V, pulleys, X Y, rod, P, and cord, W, as substantially as and for the purpose set forth.

3d, The arrangement, upon the carriers, H, of the headers, G, enlargements I, set screws, M, and detachable brackets, K, substantially as described for the purpose specified.

82,680.—Axle Head.—R. E. Bean, Franklin, N. H.

I claim, 1st, An axle, with a projecting cross bar, in combination with a head, the latter having an opening in its inner face corresponding with the cross bar, and also a spring plate, provided with a depression or points, by which latter means the cross bar is prevented from turning when once secured in place.

2d, The head, C, plate, c, constructed as shown, projection, c4, spring, c1, roa, c2, and button, c3, in combination with collar, B, with opening, b, as and for the purpose described.

3d, The head, C, constructed as described, in combination with the projection, a, of axle, A, substantially as and for the purpose explained.

82,681.—Hasp Lock.—J. H. Beauregard Kingsbury, N. Y.

I claim, 1st, The locking circle, constructed with the internal cog, V, and the tooth, W, in combination with bolt, A, and lever, L, substantially as and for the purpose described.

2d, The bolt, A, fastened substantially as described, and provided with the ears or stops, O P, as and for the purposes substantially as described.

3d, The pivoted engaging lever, L, with tooth, l, in combination with the locking circle, D, pin, M, and bolt, A, substantially as and for the purpose described.

82,682.—Apparatus for Defecating Cane Juice.—H. B. Bond, Houma, La.

I claim, 1st, The closed cistern, A, provided with the removable manhead and the stuffing boxes, constructed and operating substantially as and for the purpose set forth.

2d, The combination, with the cistern, A, of the agitator herein described, when the latter is constructed substantially as set forth, and is provided with vanes, or the equivalent thereof, arranged in such manner as to produce a pressure or packing of the gas inside the cistern, substantially as described.

3d, The pipe, G, made removable and adjustable, as described, in such manner that it can be used for discharging the juice on either side of the cistern, A, as set forth.

4th, Perforating the strainer or diaphragm, N, with holes that expand as they pass to the under surface of the same, for the purpose set forth.

5th, The sliding gate or fender, V, when constructed and operating as described and for the purpose set forth.

6th, The combination of the juice-receiver, M, when provided with the perforated strainer, N, and sliding gate or fender, V, with the cistern A, and its component parts, substantially in the manner and for the purpose set forth.

82,683.—Children's Carriage.—Francis Boylston, New York city.

I claim the brackets, C C, having extensions, b b, bolted to the ends of the sills, B, and provided with an internal screw thread into which the ends of the front axle are firmly screwed, as herein set forth for the purpose specified.

82,684.—Temple for Loom.—Lucius Briggs (assignor to himself and George Buntin), Grosvenor Dale, Conn.

I claim, in a roller temple, the center pin, as extended beyond the trough head, as set forth, and provided with passages leading into the extension, and through the pin, substantially as and for the purpose specified.

Also, in a roller temple, the center pin, as made with an oiling passage made through it lengthwise, and opening out of the side of the pin.

82,685.—Straw Cutter.—Joseph W. Brockway, New York city.

I claim, 1st, The cutter, n, and stock m, in combination with the handle, r, applied directly to such cutter or stock so that the same can be vibrated by hand, and swing in contact with the bars, o o, at the end of the feeding trough substantially as set forth.

2d, The arrangement of gearing, h d d' k and l, in combination with the feed rollers, c c, cutter stock, m, and cutters, n, as and for the purposes set forth.

82,686.—Mold for Making Acupuncture Instruments.—A. R. Brown, M.D., Albion, Mich.

I claim the former, F, having slits or mortises cast through it, as described, to receive the blades of puncturing lancets, 1 2 3, etc., in combination with a mold for casting the plungers, E B, substantially as and for the purpose specified.

82,687.—Spring Bed Bottom.—George A. Brown, Kalamazoo, Mich.

I claim the application of spiral springs, M M, combined with cords, R R, and their attachment, P P, and pulleys, K L, and pins, N N, when constructed and arranged substantially as herein set forth and described.

82,688.—Mode of Securing Horse-power to the Ground.—W. H. Buell, Union City, Mich.

I claim, in combination with each other, and with a horse power frame, the stays, C, rods, D, and stakes, S, when said parts are arranged relatively with each other, and with said frame, and constructed and connected substantially as and for the purpose specified.

82,689.—Truss.—John Burnham, Batavia, Ill.

I claim the attaching of the pad lever, C, of the truss to the spring, in the band or strap thereof, by means of a ball-and-socket joint, substantially as shown and described.

82,690.—Carriage Wheel.—J. G Buzzell, Lynn, Mass., assignor to himself and Charles Cummings, Hollis, Me.

I claim, in the carriage wheel, consisting of the hub, A, having the chambers, a a, and the caps, B B, of the spokes, C C, bent in the manner specified, the springs, E, inserted in the felly, D, and arranged and operating substantially as herein shown and described.

82,691.—Towel and Clothes Rack.—Chauncey Carrier, Columbus, N. Y.

I claim the graduated cups, B B, provided with lugs, a a, to form a seat for the end of the bar, and so arranged that the bottom of each cup, except the lowest, may fit into and turn in the top of the one next below it, substantially as described.

82,692.—Mortising Machine.—Charles Carter, Auburn, N. Y.

I claim, 1st, The tool-carrying slide, G G, guides, H H, and spreading wedge J, combined and adapted for lateral adjustment of the tools, g, substantially as described.

2d, The combination, with the tilting table, of the right and left screws, S and wheels, s s t, arranged for operating both screws in same direction, and thereby operate clamps, R R, substantially as described.

3d, The adjustable stop, Z, in combination with the rack and pinion, i j, wedge, J, and spreading-tool slide, and guides, G H, substantially as and for the purpose described.

4th, The combination and arrangement of the spreading head or slide, G H, wedge, J, rack and pinion, i j, stop, Z table, L, clamp, R, and saw, U, all constructed and operating substantially as and for the purpose described.

82,693.—CHIMNEY CAP.—Wm Chappell, Buffalo, N. Y.

I claim the arrangement of the wheel, D, over the mouth of a flue or chimney, when made in diameter larger than the mouth let, and provided with overlapping spiral vanes, E E, so as to protect the mouth of the flue, as herein set forth.

82,694.—PADLOCK.—G. W Dana, Racine, Wis.

I claim the two bolts, C C, halved or recessed at one end, and lapped, one over the other, and beveled at their outer edges, in connection with the bent levers, D D', plate, E, and spring, F, all arranged substantially as and for the purpose set forth.

82,695.—TELEGRAPHIC INSTRUMENT.—S. F. Day, Balston Spa, N. Y.

I claim, 1st, The combination of a relay and sounder, and the resistance coil, O or its equivalent, substantially as and to the effect hereinbefore set forth.

2d, The arrangement of parts herein described, or its equivalent, by which the sounder, while controlled by the relay, is also made to work the main line as a repeater, substantially as herein set forth.

3d, The combination of the magnets, D D, shafts, Q Q, clamping pieces, S and T, and adjusting screw, U, or their equivalent, substantially as set forth.

82,696.—LINIMENT FOR RHEUMATISM.—A. M. Dennen, Folsom City, Cal.

I claim the medical compound, substantially as herein described.

82,697.—SCREW PLATE.—J. S. Dutton, Jaffrey, N. H.

I claim, in combination with a screw-die plate and screw handle, C, the indexed collar, a, and the indexed shoulders, b and f, arranged substantially as described.

82,698.—MILK VAT.—J. A. Edwards, Waterford, Pa.

I claim the described arrangement, within the milk vat, of the agitators, C C, lever, D, bulkhead, F, gate, G, and furnace, B, as herein described for the purpose specified.

82,699.—CUTTER HEAD.—W. G. Farmer, Burlington, Vt.

I claim the circular grooved plate, A, provided with a collar, B, and movable grooved plate, E, in combination with the knives, D D and H H, all constructed as described and operating substantially as and for the purposes herein set forth.

82,700.—FLOOR CLAMP.—J. H Ferreira, Newark, N. J.

I claim the combination, in a clamping device, of cam, G, plunger, D, spring, E, and shackle, C, pins, H, operating substantially as and for the purpose described.

82,701.—BRAKE FOR SEWING MACHINE.—James S. Fowler, Racine, Wis.

I claim, 1st, The arrangement of the spring, F, the pivoted box or holder, E, and rubber block, D, with the table and fly wheel, as herein shown and described and for the purpose set forth.

2d, The combination of the sliding rod, G, with the pivoted box or holder, E, and rubber block, D, substantially as herein shown and described and for the purpose set forth.

27,702.—ABDOMINAL SUPPORTER.—Joseph Funkhouser Rockingham county, Va.

I claim the iron padded brace or support, A B C, the sack, E, the bands, and the manner of attaching the same, substantially as and for the purposes above described, using therefor the metal and material aforesaid, or any other substantially the same.

82,703.—SHAFT COUPLING.—J. P. Gates, Lincoln, Ill.

I claim, 1st, The disks, D and C, secured to proper shafts, with the slide or shuttle key, E, in relation to the channels, S and J, and recess, Q, or their equivalents, when constructed and operating substantially as and for the purposes set forth.

2d, The disk, C, having its shaft, K, protruding inwardly, in combination with the disk, D, having an opening in its inner face, which opening forms a bearing for shaft, K, substantially as and for the purposes set forth.

3d, The shuttle key or slide, E, with its studs, F and G, or their equivalents, for the purposes shown.

4th, The spring, N, in connection with the oscillating stud, O, and slide, E, or their equivalents, when operating substantially for the purposes set forth.

5th, The cam, L, with its semi-annular channel, J, arm, I, lever, V, head U, or their equivalents, when arranged and operating substantially as and for the purposes shown.

6th, The combination of all the above-mentioned parts and their attachments when constructed, arranged, and operating substantially as and for the purposes herein set forth and described.

82,704.—BARBERS' CHAIR.—Albert Gerdes and Julius Reiche, New York city.

We claim, 1st, A barber's chair, whose seat, back, and head rest are upholstered on both sides, the same being so connected by such mechanism that that the said seat, back, and head rest may be reversed simultaneously, in the manner and for the purpose substantially as herein shown and described.

2d, The split tube and taper ferrule, r, for the purpose of adjusting and holding the head rest, substantially as shown and described.

82,705.—SCRUBBING BRUSH.—S. Gibson, Safe Harbor, Pa.

I claim the arrangement of the shouldered plate, A, and flanged keeper, E, inclosing the strips of rubber, D, upon the forward part of the bristle brush, G, all as herein shown and described.

82,706.—SLEIGH.—E. H. Gillman, Montpelier, Vt.

I claim the draw rods, D D, for sleighs, for the purposes and in the manner and form set forth.

82,707.—CAR COUPLING.—H. C. Glasgow, Cleveland, Ohio.

I claim, 1st, The quadrangular metallic box, B, divided into two or more spaces by the horizontal partitions, g, and provided with flanges, e e, to which the bent bars, f f, are pivoted, embracing the chafing timbers, c c, whereby the box is held between and guided upon said timbers, as herein shown and described.

2d, The coupling box, B, with or without the block, C, in combination with the block, D, follower, E, links, l and k, spring, F, and stop, l or m, all made and operating substantially as and for the purpose herein shown and described.

3d, So arranging the top and bottom plates, n and o, of a coupling box, by perforating the same, that the coupling link can be inserted from the rear, substantially as herein shown and described.

82,708.—CAR COUPLING.—H C. Glasgow, Cleveland, Ohio.

I claim, 1st, The arrangement of the floor beams, A' A', when they project through a sill, B, constructed to receive them, and serve as bumpers and to carry the sliding coupling box, substantially as herein shown and described.

2d, The manner herein shown and described of fastening the two ends of each U-shaped draft bar, e, to the coupling box by means of one pin, f, substantially as herein shown and described.

3d, The arrangement and combination with each other of the coupling box, G, block, I, spring, g, transom, o spring, H, and draft bars, e, all made and operating substantially as and for the purpose herein shown and described.

82,709.—TRACE BUCKLE.—William W. Gordon and Dexter Pettengill, Delhi, N. Y.

We claim the combination and peculiar arrangement of the frame, A, tongue plate, C, and tug strap, E, in the manner and for the purposes set forth in the above specifications

82,710.—DOUGH MIXER.—Francois Grenior, Beroserac, France, assignor to G. H. Mercer and A. S. Monod, New York city.

I claim, 1st, The rotating spiral blades, J J, and the rotating beaters, H H, arranged in pairs, each pair having a bottom scraper, b, in combination with the frame, A, substantially as described for the purpose specified.

2d, The dough-mixing machine, consisting of the rotating annular trough, C, rotating beaters, H H, rotating screws, J J, and fixed scrapers, I I, all made and operating substantially as herein shown and described.

82,711.—MANUFACTURE OF EDGE TOOLS.—Reuben C. Grover, Newton, Mass.

I claim the knife, A b, constructed as described, and as a new article of manufacture.

82,712.—APPARATUS FOR THE MANUFACTURE OF VINEGAR.—Theodore Grundmann, Cleveland, Ohio.

I claim, 1st, The braided strands, D D, when used in a vinegar apparatus, for spreading the mash and exposing it to the air, as set forth.

2d, The self-regulating swinging mash-distributing box, G, arranged substantially as herein shown and described.

3d, The box, A, when composed of a series of detachable plates, as set forth, so that the suspended braids, D, may be exposed to the air to be dried.

4th, A vinegar apparatus, consisting of the box, A, vessel, B, frame, C, braided pendants, D, distributing box, G, and supply and discharge pipes, I and j, all made and operating substantially as herein shown and described.

5th, The device set forth in the foregoing clause, in combination with the filter, H, in which the two perforated plates, l and m, are arranged, as set forth.

6th, The distributing sheet, E, arranged between the swinging box, G, and the braided pendants, D, substantially as herein shown and described.

82,713.—WASH BOILER.—J. A. Hammer and Thomas Chadwick, Newton, Iowa.

We claim, 1st, A clothes washer, so constructed as to form one lower or boiling chamber, one clothes chamber, and one or more reservoirs for supplying clean hot water, substantially as herein set forth.

2d, A clothes washer, constructed as described, with one or more reservoirs, connected by valves to the boiling chamber below, which valves can be opened and closed at will from the top of the boiler, substantially as and for the purposes herein set forth.

3d Passing the steam conducting tubes of a wash boiler, constructed as specified, through the water reservoirs, for the purpose of heating the water contained therein, substantially as and for the purposes herein set forth.

4th, In a clothes washer, the combination of a clothes chamber, boiling chamber, C, one or more reservoirs, E, tubes, F F, perforated mouth pieces, G G, perforated bottom, D, and valves, b a and e, all arranged as described, and operating substantially as and for the purposes herein set forth.

82,714.—EXPLOSIVE PROJECTILE.—A. O. H. Hardenstein, Clinton, Miss., assignor to himself and Marcellus A. Foute, New Orleans, La.

I claim, 1st, The combination of the disk, N, and rod, M, with a projectile, substantially as herein described, when these parts are constructed and operate substantially as and for the purpose set forth.

2d, The wedge formed bars, A, in combination with a projectile, substantially as herein described, when the same are constructed and operated substantially as herein described for the purpose set forth.

3d, The bar, A, in combination with the disk, N, when these several parts are constructed and operate as herein described, in connection with a projectile, substantially as herein described for the purpose set forth.

82,715.—DEVICE FOR CASTING LUGS AND DOVE TAILS.—George W. Herrick (assignor to himself and H. H. Gibbs), Stuyvesant, N. Y.

I claim, 1st, The hand tool, B, for forming the mold in which the spur, b, is cast upon the lug, a, of a stove top, consisting of the hollow and slotted goose, C, bearing the lever, f, hung upon the transverse shaft, e, the projection, g, upon the lower end of said lever being held through the side of the cone by the spring, i, upon the upright, h, all arranged and operating as described for the purpose specified.

2d, The tool, H for forming the mold in which the spurs, k k, are cast upon pin, j, consisting of the cylinder, I, whose lower end is slotted upon opposite sides at r r, the rod, l, having the projecting foot, m, and hung loosely upon the shaft, n, which works in the slots, o, of the cylinder, I, said projecting foot being held above the slots, r, by means of the spring, p, bearing against the shaft, n, all arranged and operating as described for the purpose specified.

3d, The tool, M, for casting the beveled lugs, w w w, upon the stove plate, J, consisting of the plate, a', having the slides, b' b', provided with projections; c' c', which are kept within the projections, d', by means of the spiral springs, e' e', all arranged and operating as described for the purpose specified.

82,716.—SOLE-CUTTING MACHINE.—Micah Hobbs, Natick, Mass.

I claim the combination of the bed, B, and its mechanism for operating or moving it, as described, with the rotary cutter, A, and mechanism for elevating and depressing, and revolving it, in manner substantially as specified, the bed being arranged over the rotary cutter, as explained.

82,717.—BUTT HINGE.—H. Hockemeyer, Toledo, Ohio.

I claim, in combination with a loose pin butt hinge, the collar, d, the lip, e, and the slots, f and g, constructed and arranged substantially as shown and described for the purposes set forth.

82,718.—STAVE MACHINE.—James Holmes, Belfast, Me.

I claim the pinions, f, and shaft, A, arranged with reference to the racks, g, of the bolt carriage, the shaft, L, pinions, i, shaft, N, pawl, o, and lever, P, whereby the bolt carriage is moved evenly toward the saw, as herein described for the purpose specified.

82,719.—MODE OF PRESERVING FRUITS, MEATS, VEGETABLES, AND OTHER PERISHABLE SUBSTANCES.—J. Burrows Hyde, New York city.

I claim the material described for the purposes set forth.

82,720.—SUSPENDER AND SHOULDER BRACE COMBINED.—Ebenezer Jennings, Jr., New York city.

I claim, 1st, A combined shoulder brace and suspender, provided with the loop, C, on one end of each of the main straps, adapted to receive the reverse ends of the opposite straps, substantially as and for the purpose set forth.

2d, In combination with a combined shoulder brace and suspender, provided with the loop, C, on one end of each of the main straps, as and for the purpose described, the button hole tags, B, as and for the purpose specified.

3d, In combination with the subject matter of each of the said first and second claims, an adjustable slide, through which both of the main straps pass, crossing each other, substantially as shown and described.

82,721.—FURNACE DOOR.—Luman F. Johnson, Buffalo, N. Y.

I claim the recessed fire bricks, B, so arranged within the cast iron frame, as to overlap the flanges, a', thereof, and protect the same, substantially as described.

82,722.—WASHING MACHINE.—John Stafford Kelley, New York city.

I claim the combination, in a washing machine, of an oscillating drum, barrel, or box, A, with a number of floating rubbers, composed of pliant sleeves, containing buoyant balls, arranged in a row, all substantially as shown and described, and for the purpose set forth.

82,723.—DRUM FOR HOT-AIR FURNACE.—John H. Keyser, New York city.

I claim the radiating attachment herein described, constructed with an opening through the top of its drum, A, substantially as specified.

82,724.—TOY HOOP.—John L. Lay, Buffalo, N. Y.

I claim the relatively stationary hoop, B, supporting an image or images, in combination with an outer eccentric and rotating hoop, A, provided with rollers, e e, or their equivalents, which gives motion to the image through intermediate levers, h, and connecting rods, i, or their equivalent, substantially as set forth.

82,725.—STRAP BOLT.—William J. Lewis and Henry W. Oliver, Jr., Pittsburg, Pa.

We claim a new article of manufacture, iron rolled to constitute a series of blanks, in bars, for strap bolts of the form herein described.

72,726.—CARRIAGE SPRING.—Josiah R. Locke, San Francisco, Cal.

I claim, 1st, The box, J, elastic packing or spring, K, and the extension braces or rods, L L, attached to the side springs, G G, substantially as and for the purpose specified.

2d, The combination of the side springs, G G, with the C-spring, I, by the shackle connection, H, the C springs extending around the axle bed and attached to the reaches, substantially as described.

3d, The springs, E E, crossing the upper ends of the springs, G G, and passing over the bolster, and attached to the forward ends of the outside reaches, substantially as described.

82,727.—CARRIAGE SPRING.—Joseph R. Locke, San Francisco, Cal.

I claim, 1st, In combination with the wood and steel springs, A A, the goose neck springs, D D, constructed substantially as described.

2d, The double-acting springs, F F, and the slides, E E, in which the lower ends move, or equivalent device, the whole constructed to operate substantially as described.

82,728. ANTI-FRICTION STEAM ENGINE VALVE.—Kellogg H. Loomis, New York city.

I claim, 1st, An oscillating steam valve, suspended from and having its bearing and turning upon an adjustable center point above its seat, in the line of its axis, substantially as described.

2d, In combination, the valve stem, support, E, yoke, F, and set screw, H, all constructed and arranged substantially as shown and described.

3d, The arrangement of the ribs, b', between the posts, extending from the base to the outer surface and apex of the cone, substantially as set forth.

82,729.—GOVERNOR FOR STEAM ENGINE.—Jeremiah A. Marden (assignor to Augustus Lynch and Reuben K. Huntoon), Boston, Mass.

I claim the arrangement and combination of the float, D, its arm, e, the tubular shaft, C, the spindle, f, vessel, A, and its cover, , as specified.

Also, the arrangement of the said float, D, arm, e, spindle, f, tubular shaft, C, lever, E, and its hanger, H, as set forth.

Also, the arrangement of the compensating arm, M, and weight, N, valve arm, I, hanger, H, lever E, spindle, f, tubular shaft, C, float, D, arm, e, and the vessel, A, substantially as specified.

Also, the combination of the cam, n, slotted arm, m, and the movable standard, o, with the hanger, H, lever, E, spindle, f, tubular shaft, C float, D, arm, e, and the vessel, A, substantially as set forth.

82,730.—AMALGAMATOR.—George A. Mariner and Julian Kune, Chicago, Ill.

We claim, 1st, The cylinder, a c, provided with the conical plate or bottom, b, in combination with the cylinder, d f, supported above the bottom, substantially as shown.

2d, The annular plate or diaphragm, e, to regulate the dispersion of the ores, when provided by the rods, n, substantially as specified.

3d, The perforated annular plate, r, when provided with the rods, substantially as and for the purposes described.

4th, The inclined partition or chute, B, constructed and operating in combination with the discharge spout, v, substantially as specified.

5th, The tube or pipe, b, when made to pass through the furnace, w, in combination with the escape or condensing-pipe, G, substantially as and for the purposes specified.

6th, The extension feed pipe, l g, whether used with or without a screw carrier, substantially as specified.

82,731.—MANUFACTURE OF ARTIFICIAL STONE.—A. H. Marret, Water Works, Ky.

I claim the process of manufacturing block, substantially, for all building purposes, as herein described.

82,732.—APPARATUS FOR WASHING, BLEACHING, AND CLEANSING YARNS, BOBBINS, AND OTHER MATERIALS.—James Garth Marshall, Leeds, England.

I claim, 1st, The combination, with the vessel, A, of the supply pipe, D, opening into a chamber, C, one or more sets or spool holding studs, e and h, and an exhaust pipe, N, substantially as and for the purpose described.

2d, The employment of the open web, S, in combination with a closed vessel, A, substantially as and for the purpose described.

82,733.—FENCE.—Nathan Maxson, Wilmington, Ohio.

I claim the fence, A B C, constructed as described, that is, having the foundation, A, interior, B, and covering, C, the latter being laid on in sections, with beveling edges, and being strengthened, at regular intervals, by bars, formed in the manner described, the whole being combined and arranged as and for the purposes set forth.

82,734.—SCHOOL SLATE.—Frank Melville, New York city.

I claim the notches, a a, in the inner edge of the frame, B, of the slate, in connection with the spring, b, and the removable copy, C, all arranged substantially and for the purpose herein set forth.

82,735.—FILTER FOR SACCHARINE AND OTHER LIQUIDS.—Helen Merrill, New York city. Antedated September 30, 1868.

I claim, 1st, The arrangement of the filtering material, partly inside and partly outside the filter.

2d, Operating a sheet of filtering material so that it passes in and out of a filter, either continuously or at intervals, as may be required.

3d, supporting and securing a traveling apron by means of endless belts, substantially as described.

82,736.—ROTARY BLOWER.—James Mitchell, Philadelphia, Pa.

I claim the combination of the direct tangential discharge port, B, rotary fan, D, eccentric casing, A, and concentric partition, E, all constructed and arranged as herein represented and described, for the purposes specified.

82,737.—WATER METER.—George R. Moore, Lyons, Iowa.

I claim, 1st, The water ways, o o o o, through the plate, , in the manner and for the purpose herein set forth.

2d, The forcing plate, C, upon its journals, f, operated by the water substantially in the manner and for the purposes herein set forth.

3d, The springs, d d, used in operating the valve, B, substantially in the manner and for the purpose herein set forth.

4th, The levers, a a, and regulating screws, g g, substantially in the manner and for the purpose herein set forth.

5th, The dividing plate, e, substantially in the manner and for the purpose herein set forth.

82,738.—CLAMP FOR IRON STRUCTURE.—James M. Moorehead, Brooklyn, N. Y.

I claim the four plates, A B C and D, formed and combined substantially as shown and described, for the purpose of clamping crossed rods, all as set forth.

82,739.—MACHINE FOR DESICCATING LEACHED TAN AND OTHER SUBSTANCES.—Charles H. Moseley, Winchester, Mass.

I claim the arrangement, as well as the combination of the endless apron or conveyer, B, the hopper, C, through which it passes, the auxiliary hopper, M, and the pair of heating and expressing rollers, K L, such being provided with mechanism for operating them, substantially as described.

Also, the arrangement and combination of the leaching vat, A, the endless apron, B, the hoppers, C M, and the pair of expressing rollers, K L, the whole being disposed with a frame, as set forth.

Also, the combination of the elevator, N, with the expressing rollers, K L, the two hoppers C M, and the endless apron, B, or the latter and the leaching vat, A, the whole being arranged in a frame, and provided with mechanism for operating them, substantially in manner and for the purpose or objects as hereinbefore specified

82,740. PATTERN FOR CUTTING OUT SHIRT.—Jas. H. Myers (assignor to himself and C. T. Rice), New York city.

I claim the diagram for cutting shirts, consisting of the back, yoke, front, bosom, neck band and sleeve patterns, or the configuration shown, having graduated measurements delineated thereon, substantially as shown, for the purpose specified.

82,741.—FEEDING AND COOLING DEVICE FOR GRAIN MILL.—John Nairn (assignor to himself and Mathew Pfaffilin), Milton, Ind.

I claim the arrangement of the vessel, A, tubes, B B C, and curved lateral tubes E E, and scraper, D, when combined and operated substantially as and for the purpose herein described.

82,742.—ROTARY STEAM ENGINE.—Elim Osborn (assignor to himself and Henry Beard), Economy, Ind.

I claim, 1st, The combination of the revolving disk plate valve, b, steam chest, D, and shaft, A, substantially as set forth.

2d, The arrangement of the steam pipes, E E, steam chest, D, and apertures, m, with reference to the shaft, A, and wheel, B, substantially as described.

82,743.—CIGAR PIPE.—Adolphe Achille Pathi, Paris, France.

I claim a tobacco pipe, having a lid, b, provided with a prolongation, d, terminating at the outer end in a form resembling a burning cigar, and perforated for the admission of air to support the combustion of the tobacco, substantially as and for the purpose described.

82,744.—RAILWAY RAIL JOINT.—E. G. Patterson, Pithole City P.

I claim, 1st, The chair, D, made with the inner side of its jaws inclined or wedge-shaped, substantially as herein shown and described, and for the purpose set forth.

2d, The clamps, F, constructed as described, and provided with bolts, G, and nuts, H, in combination with the fish-plates, C, by which they are supported, and with the wooden bar or bars, E, which they support, substantially as herein shown and described, and for the purpose set forth.

3d, The combination of fish plates, C, and chair, D, with each other and with the ends, A B, of the rails, substantially as herein shown and described, to form a rigid support for the said ends of the said rails.

4th, The combination of the fish plates, C, chair, D, wooden bar or bars, E, and clamps, F, with each other and with the ends, A and B, of the rails, substantially as herein shown and described, and for the purpose set forth.

82,745.—QUICKSILVER FEEDER FOR QUARTZ MILL.—John Pattison, Nevada, Cal.

I claim, 1st, The quicksilver fountain, C, with the vertical pipes, D, and F, above and below the horizontal shaft, substantially as described.

2d, The cup, G, in the horizontal shaft, E, graduated by the set screw, G, or their equivalents, substantially as and for the purpose described.

3d, Coupling the shaft, E, together by the slotted ring, H, and keys, H' H', and operating the machine by the lever, K, pawl, K', and toothed wheel, J, the whole constructed and arranged to operate substantially as described.

82,746.—VENTILATOR.—Jethro Peckam and John Peckam, Middletown, R. I.

We claim the combination, with the ridge cover, A, supported on the vertically sliding studs, B of the winding shaft, C, and cords, D, substantially as and for the purpose specified

82,747.—POROUS ALUM.—Henry Pemberton, Allegheny City Pa.

I claim as a new article of manufacture, the sulphate of alumina, prepared in a porous or visicular state, whether in lump or ground to a coarse or fine powder, substantially as described.

82,748.—MACHINE FOR STRETCHING AND BLOCKING HATS.—Starr Polley, Brooklyn, N. Y.

I claim 1st, The arrangement of the flat elastic ring or band, T, of rubber, over or outside of the hat body f as shown and described in combination with stretching device, B, when arranged to operate relatively thereto during the stretching operation, substantially as and for the purposes herein set forth.

2d, The elastic band, T, in combination with a hat-body and with the block, O, and stretching device, B so as to perform the double function of clamping or holding the hat body in place upon the stretching machine in the act of stretching the tip, and also of holding the body upon the block during the subsequent operation, substantially as herein described.

82,749.—HORSE HAY RAKE.—Peter Prescott (assignor to Isaac M. Hall, William J. Hall and C. M. Prescott), Booneville, N. Y.

I claim the plates, a a, rods, l, arms, b b, arranged substantially as described, for the purpose of lessening the pressure of the shafts or tongue of a revolving horse rake, all as set forth.

82,750.—LANTERN.—George W. Putnam, Boston, Mass.—Antedated September 26, 1868.

I claim the employment or use, with a portable lantern, of a movable magazine, when all are constructed and arranged substantially as shown and described.

82,751.—CUT-OFF FOR STEAM ENGINE.—George W. Rawson, Cambridgeport, assignor to himself and Michael Hittinger, Somerville, Mass.

I claim the arrangement and combination of the stopping chains with the steam chest, the sliding, main, and cut-off valves, the springs, k k, the rods, g g, the paws or catches, m m, and the tripper, p, to be applied to a governor, the whole being to operate in manner as described.

Also, the arrangement of the valve seat projections, c', or the equivalents thereof, in relation to the steam chest, A, the main and cut off slide valves, B e e, the stopping chains, the springs, k k, the cut off valve rods, g g, the paws, m m, and the tripper, p, the whole being as specified, the valve seat projections enabling the steam to effect the balancing of the cut-off valves as explained.

82,752.—MATCH SAFE.—Hiram Richmond (assignor to Chas. Parker), West Meriden, Conn.

I claim the match safe, constructed as described, of the back plate, A, the box, B, having the vertical opening, b, for the thumb and finger, and the inclined hinged lid, C, having opening, c, corresponding to the opening, b, in the box, all arranged as described for the purpose specified.

82,753.—CULTIVATOR.—William Rodgers, Lynnville, Ind.

I claim the rake, K, supported and braced as described, by the vertical and lateral rods, and having itself vertical teeth, in combination with the cultivator, provided with the steadying wheel, H, all constructed and arranged as and for the purpose set forth.

82,754.—FOLDING EASY CHAIR.—Charles C. Schmitt and Rudolph Wodrich, New York city.

We claim, 1st, The application to the roller, F, around which the band G, is wound, of the spring, c, ratchet wheel a, and spring pawl, b, all made and operating substantially as herein shown and described, for the purpose of locking the chair automatically in any desired position as set forth.

2d, The cam, J, arranged in connection with the spring pawl, b, for the purpose of allowing the band to be unwound and the seat to be lowered, substantially as herein shown and described.

3d, Pivoting the seat, I, to one set of supports only, of an X-shaped chair frame, when said frame is provided with a self-acting band, G, and roller, F substantially as and for the purpose herein shown and described.

4th, The rod, K, and lugs, g, when arranged on an X shaped stool frame to prevent extreme expansion of the same, as set forth.

82,755.—FOLDING CHAIR.—Charles C. Schmitt, and Rudolph Wodrich, New York City.

We claim the folding chair, consisting of the combination of the seat, A, which is pivoted or hinged to the legs, B C, with the rods, a b d e, bands or staples, c f, rod, h, slotted arms, E, hinged to the legs, B, pins, k, and band, I, all made and operating substantially as herein shown and described.

82,756.—EXPRESS SIGNAL.—Chas. H. Seawell (assignor to G. F. Lewis), St. Louis, Mo. Antedated Sept. 24, 1868.

I claim the signs, c and c', placed in pairs on a pivot wire, b, and arranged with calling signs on one face, but blank on the reverse, so that the call shows on both sides when it shows at all, as described

82,757.—BEEHIVE.—Thomas Shields, Hillsboro, Ohio.

I claim 1st, The two series of removable honey frames, of different widths, arranged the one above the other, between the upper and lower ventilating air chambers, substantially as herein set forth.

2d, The glazing of the outermost of the lower series of honey frames in the hive, when the said glazed honey frames are located opposite to the removable sections, B B, of the side casings of the hive, substantially as herein set forth.

3d, The glass face of the alighting board, h, when the said alighting board is arranged with the other parts of the hive, substantially in the manner herein set forth.

82,758.—GOVERNOR FOR ENGINES, WATER WHEELS, ETC.—James P. Sibley and Arthur Walsh, Bennington, Vt.

We claim, 1st, The arrangement of the eccentric, L, on the shaft, B, for operating slide, N, and the collar, I, fitted on shaft, B, and connected by shaft, K, and levers, J P, and arm, S, for the purpose of operating the shell, R, substantially as specified.

2d, The slide, N, provided with the pawls, O O', in connection with the wheel, P, all arranged, substantially as set forth.

3d, The metallic strap, W, attached to the spool, X, on shaft, Q, connected with the shafts V and K, all arranged as specified.

4th, The slide, A', when arranged or placed in relation with slide, N, and wheel, P, substantially as specified.

82,759.—SAW SET.—L. T. Smart, Ossipee, N. H.

I claim the die, A, adjusted in the holder, B, by the screw, F, and provided upon its upper face with faucets of varying inclination, corresponding to the inclinations of the faucets upon the under side of the movable die, D, all constructed, arranged, and operating as herein described and shown, for the purpose specified

82,760.—SPRING SEAT.—Chas. B. Smith (assignor to himself and Quincy A. Fisk), Springfield, Ill.

I claim the improved spring seat bottoms composed of the hooked strips, A, rivetted together as described, in combination with the double coiled springs, supported on the frame, and provided with the loops, B, substantially as and for the purpose described.

82,761.—STOVE DRUM.—Chas. D. F. Smith, Geneva, Ill.

I claim constructing the inclined plane forming the spiral flue around a central drum, cylinder, or reservoir, wholly or in part in sections, susceptible of being adjusted to form a continuous circuitous spiral flue, or to open vertically and permit a direct vertical draft, substantially as and for the purposes set forth and described.

82,762.—WATER GAGE.—H. P. Stafford and H. H. Stafford, Decatur, Ill.

We claim, 1st, The employment of an independent registering pointer, R, in combination with the float pointer, P, substantially as and for the objects herein described.

2d, Operating the registering pointer, R, by means of the float pointer, P, substantially as and for the purposes shown and described.

3d, Having the registering pointer, R, pivoted upon the sector, substantially as and for the purpose hereinbefore shown and described.

82,763.—PROCESS OF TANNING HIDES.—Geo. A. Starkweather, Wayneart, Pa.

I claim, 1st, The process of tanning hides or skins into leather, by the use orise, alkali, fermented wheat bran, and decoction made from plants, salt, oil of virriol, and tan liquor, as set forth.

2d, The use of plants in laying away hides or leather.

82,764.—CLEVIS FOR PLOWS.—David Stewart Corinna, Me.

I claim in combination with the spiral shaft, D, and link, E, the slotted plate, F, clamp bolt, C, and nut on the stirrup, G, for adjusting the side draft, as herein set forth.

82,765.—DESK AND SEAT.—G. A. Stewart, Des Moines, Iowa.

I claim a combination of the standards, A A, folding seat, C, bars, D D, blocks, E E, folding desk, F, shelf, G, box, H, and slide, I, all arranged and operating as herein set forth.

82,766.—SHEET METAL CAN.—John H. Stone, Philadelphia, Pa. Antedated Sept. 26, 1868.

I claim, 1st, In combination with the internal bead, a', a lap joint, consisting of three thicknesses of the sheet metal pressed closely together, and the upper half of the same then bent inward to a right angle, so as to produce the angular flange, d, around on the inner side of the chime of the vessel, and parallel with the end plate of the same, substantially as set forth and described, for the purposes specified.

2d, The sliding stopper or cover, E E, constructed and operated as set forth, for the purpose of closing the mouths of sheet metal vessels, as described.

82,767.—COMBINED FLOATING FIRE ENGINE AND WRECKING PUMP.—George W. Talcott (assignee to himself and Isaac D. Voak), Buffalo, N. Y.

I claim, 1st, The pipes, C D, provided with value, c, and valve, f, or cap, and uniting and connecting with a force pump, B, arranged in the hold of a vessel, substantially in the manner and for the purpose set forth.

2d, The combination and arrangement within a vessel of the pump, B, pipes, C D G G', and nozzle chamber, I, forming a combined floating fire engine and wrecking pump, in the manner described.

82,768.—BUCKLE.—Samuel A. Tenny, Muskego, Wis.

I claim a clamp or buckle consisting of the frame, A, having inclined grooves, E, made in the side pieces, D, and the block, B, provided with inclined flanges, F, and the loop, G, all substantially as described.

82,769.—ADJUSTING SPIRIT LEVEL.—Justus A. Traut (assignor to the Stanley Rule and Level Company, New Britain, Conn.

I claim, 1st, Suspending the vial case, c, within the stock, b, and adjusting the same to its relative position with the stock, b, by means of the plate, c', screw, or screws, e, and springs, d, substantially as and for the purpose described.

2d, The spirit vial case, B, constructed as described, with the springs, k, screws, n, operated through orifices in the plate, i, substantially as and for the purpose set forth.

3d, The combination of the adjusting plate or nuts, springs, k, and screws, n', substantially as and for the purpose described.

82,770.—HAY RAKER AND LOADER.—Lester Underwood, Ottawa, Ill.

I claim, 1st, The arrangement of the ropes, t t, and u u, in combination with the standards, b b, and braces, v v, substantially as described, and for the purpose of enabling the machine to be used from the wagon.

2d, The clevis, D, and pin, c', with rope attached, in combination with the loop, b', substantially as and for the purpose described.

3d, The peculiar arrangement of the shaft, e', grooved pulleys, d' d', wheel, f', lever, h', and stirrup, k', in combination with the rakes, C C C, substantially as and for the purpose described in the foregoing specification.

82,771.—DIE FOR STAMPING STOVE PIPE DAMPERS.—Isaac Van Hagen, Chicago, Ill.

I claim a die, A G, the movable part, A, of which has a V shaped projection, C, fitting in a corresponding depression, E, in the stationary part, G, and the stationary part, G having V-shaped projections, D F, fitting in depressions, B B, in the movable part, A, as and for the purpose described.

82,772.—SKIRT SUPPORTER.—N. A. Vurgason, Brooklyn, N. Y.

I claim the skirt supporter, constructed as described, of the hinged metallic zone, A A, whose ends are secured together by the overlapping spring catch, D, and whose outer surface is provided with the hooks, a a, covered and protected by the flap or fillet, B, said zone being attached at its lower edge to the inner curtain or flap, G, all arranged as described, for the purpose specified.

82,773.—LOOM FOR WEAVING PILE FABRIC.—William Webster, Morrisania, N. Y. Antedated August 24, 1868.

I claim, 1st, The guide, C, pusher, G, and sliding block, in combination, when constructed, arranged, and operating substantially as described, and for the purpose set forth.

2d, The vibrating lever, D, having grooves, E E', and oscillating guide, F, or its equivalent, in combination with the pusher, G, or its equivalent, for the purpose set forth.

3d, In combination with the vibrating lever, D, with or without the grooves E E', and oscillating guide, F, the oscillating lever, H, oscillating block, I, having incline planes, and sliding rod, J, substantially as herein described, and for the purpose set forth.

82,774.—SUGAR PAN DERRICK.—Andrew J. Weed, Hardwick, Vt.

I claim, 1st, The pivoted or hinged frame, A, constructed substantially as described, in combination with the circular track, C, as and for the purpose set forth.

2d, The combination of the adjustable sliding frame, D, shaft, E, drum, e', shafts, F F, cross bar, I, adjustable vertical bar, H, and pivoted bar, G, with each other, and with the pivoted frame, A, substantially as herein shown and described, and for the purpose set forth.

82,775.—COMBINED HARROW AND CULTIVATOR.—N. W. Wheeler, Ripon, Wis.

I claim the combination, and mode of attachment of a harrow and cultivator, substantially as described, and for the purposes specified.

82,776.—DENTISTS' CHAIR.—Otis C. White, Hopkinton, Mass., and Austin T. Ashmead, Hartford, Conn.

We claim the combination and arrangement of the slotted arched bar, H', the swivel bar, G, the clamp screw, I, and the friction collar, g, applied to the spindle and the seat frame, as specified.

Also, the arrangement of the metallic seat frame, D, made with the foot and arm holes as described, the foot rest supporting frame, E, and the elevating screws, and their operative shaft and gears, as explained.

Also, the combination, applied to the stand and the seat frame, for effecting the adjustment of the latter in vertical and horizontal planes, as set forth, such consisting of the spindle, the feather connection, the rack, the scroll cam, with its cranked shaft, the collar, g, the clamp screw, I, the arched bar, H', and the swivel bar, G, arranged as specified and represented.

82,777.—HORSE POWER.—B. H. Wilcox, Petroleum Center, Pa.

I claim the combination of the table, A, having cam profiles, C, and mounted upon the cross timber and plate, J I, the pivoted lever D, rollers a a, connecting rod, E, dove tailed slide, H, and bed, G, all constructed and arranged to operate as described, for the purpose specified.

82,778.—BUTTON.—Frederick Wittram, San Francisco, Cal.

I claim, 1st, A button or stud, having an opening in its fastening disk or plate, closed by a movable segment or piece, substantially as shown and described.

2d, In combination therewith, a closing or retaining spring, substantially as set forth.

82,779.—CUTLERY.—Walter D. Woods (assignor to himself and Ebenezer F. Woods), Bennington, N. H.

I claim the handle, B, made tubular throughout its length, and having the connection piece, E, of the two bolsters arranged in the bore of such handle as specified.

Also the handle as made with the tang socket chamber, g, arranged in it in manner, and to open out of its upper end, and with a passage, f, extended from such chamber to the rear of the handle, as set forth.

Also, in combination with the chamber, or socket mold, g, formed in the handle, as set forth, the metallic bolster, C, and tang supporter, p, cast in one piece, in and against the handle, and on the tang, as set forth.

Also the combination of the rivet projection passage, h, of the handle, B, with the bore, f g, thereof, as set forth.

And in combination with the handle, B, and its metallic bolsters, C D, and their connection, E, when cast in one piece in the handle, as described, the rivet projecting molding passage of the handle, and the metal, o, cast therein and in one piece with the connection, E, as specified.

Also, the combination of the rear tang hole, l, with the metallic extension n, the rivet projection, o, and its molding passage, h, of the handle, B, as set forth.

Also, the handle as formed tubular throughout, or from end to end, and with the two bolsters and their metallic connection cast in one piece with respect to such handle, and upon the tang of the blade, the whole being substantially as described.

82,780.—MACHINE FOR SCOURING SHEET METAL.—Horace B. Wooster, Waterbury, Conn., assignor to Waterbury Brass Company. Antedated April 6, 1868.

I claim, 1st, The described arrangement of the revolving brushes, B C, guide roller, F, winding up roller, D, gearing, E, and adjustable riders, b c, all operating as described, to polish thin elastic strips of sheet metal, as herein set forth.

2d, The revolving brushes, B and C, in combination with the adjustable riders, b and c, all made and operating substantially as herein shown and described.

3d, The described arrangement of the cylinder, D, with relation to the revolving brushes, B C, and adjustable riders, b c, for winding and unwinding the sheet metal, in the manner herein set forth and shown.

82,781.—COMPOUND DOUBLE TREE.—John Wykoff, Grant City, Mo.

I claim the double trees, D D, tongues, A A, single tree, E G E, chains, b b, or their equivalent, all constructed and operating substantially as and for the purpose shown and described.

82,782.—HARVESTER.—Geo. W. N. Yost (assignor to Corry Machine Company), Corry, Pa.

I claim the elastic floating bar, S, rigidly attached to the main frame or body, A and A', with the end, l, fastened to the middle of the bind end of the body, and with end, k, fastened to the middle of the fore end of the body, as described for grass and grain cutting machines.

82,783.—FURNITURE CASTER.—Anson T. Adams, Indianopolis, Ind.

I claim the combination of the spherical socket of the halves, B C, with the hexagonal edge, held together by the nut, d, and the conical screw, e, as and for the purpose specified.

82,784.—CLOD CRUSHER.—Dr. T. H. Ashton, Defiance, Ohio.

I claim the double harrows, A A, and rollers, D D, when the same are so combined and arranged as to operate substantially as described, as and for the purpose specified.

82,785.—EQUALIZING WHIFFLE TREE.—H. W. Austin, Portage, Mich.

I claim, 1st, The arrangement of the equalizing evenrs, E, with both of the double tree strips, A, grooved pulley, P, chain, F, and whiffle trees, D and D', all constructed and operating substantially as and for the purpose herein set forth.

2d, The arrangement of the evenrs, E E, in such relation to the whiffle tree D', by means of the pulley, P, and chain, F, that when an outside horse starts, the reaction will be divided between the other horses, in the manner substantially as described.

82,786.—GAS MACHINE.—N. W. Bancroft, Worcester, Mass.

I claim, 1st, The pump or fan, consisting of the cylindrical case, F, with the curved partitions, b, and having the inlet openings, e, and exit holes, o, arranged substantially as described.

2d, The air chamber, C, having the partition, h, with the valve, l, and pipes p, arranged to operate as set forth.

3d, The reservoir, B, with the flexible diaphragm, f, and the gas pipe, X, with its regulating valve, Z, constructed and arranged to operate substantially as described.

4th, The copper plate, K, located under the chamber, J, for the purpose of conducting and equalizing the application of heat to the fluid as set forth.

5th, The circulating chamber, formed by the application of the plate, C, with its opening, m, arranged within the chamber, J, substantially as described.

6th, The use of the cement, herein described, for preparing the flexible diaphragm and other parts of the machine, as set forth.

82,787.—PROPELLING APPARATUS.—E. S. Barnes, Nebraska City, Nebraska.

I claim, 1st, The cogged sectors, C C1, in combination with the paddle, D, when arranged and operated substantially as set forth.

2d, The combination of the reversing sectors, E E1, and their operating bar E2, when acting to operate the bar, C3, and rack, c3, for feathering the paddles at either end of stroke, and reversing the same, substantially as set forth.

82,788.—COMPOSITION CLOCK DIAL.—Stephen Barnes, New Haven, Conn.

I claim, 1st, A composition clock face or dial, formed from a plastic composition substantially in the manner described.

2d, A composition clock dial, in which the raised letters or ornamentations while made in one piece with the body of the dial, are formed of a composition differing in color from that of which the body is composed.

3d, The application, to a composition clock dial, of a perforated plate, or its equivalent, pressed into the dial while the latter is in a plastic state, substantially as set forth.

82,789.—SAW FOR FELLING TREES.—F. Bauschtliker (assignor to himself and Frederfck Gentner), Washington, D. C.

I claim the double bladed saws, J J, screw, N, ratchet, P, and movable frame, G, when arranged, combined, and operated as herein described, and for the purpose set forth.

82,790.—BUSHING FOR WHEELS.—Thos. Blake, Stockton, Cal.

I claim the bushing, C, provided with the cylindrical bore, D, and having its external surface polygonal, as and for the purpose described.

82,791.—FOLDING CHAIR.—Peter Born, New York city.

I claim, 1st, The part, C, composing the arm pieces and front legs when constructed in one piece, attached to the back, B, by pivots, a, and arranged to fold up in the manner and for the purpose described.

2d, The parts, B and C, when constructed as described, in combination with the hinged seat, D, substantially as and for the purpose set forth.

3d, The stops, d, and cross bar, c, in combination with the part, C, seat, D, and part, B, of a chair, all constructed and operating as and for the purpose set forth.

82,792.—MACHINE FOR TENONING BLIND SLATS.—T. J. Bowdle, S. R. Lawder, and F. E. Johnson, Piqua, Ohio.

We claim, 1st, A T-shaped vibrating lever, P, in combination with toggle joint levers, N N, suitable connecting links, M M, and with sliding carriages, C C, carrying the shoulder-cutting bits, a a, of a slat-tenoning machine, all arranged and operating substantially as and for the purpose herein set forth.

2d, In combination with the foregoing devices, combining with one arm, p', of said vibrating lever, P, a connecting link, R, pivoted to a collar, G, embracing the tubular center bit, F, of the machine for the purpose of operating the same, all substantially as is herein specified.

82,793.—COMBINED LAND ROLLER AND CLOD PULVERIZER.—John Brewer, New Vienna, Ohio.

I claim the drums, B B, provided with knives, C C, in combination with the cultivator, E, when constructed and operating substantially as and for the purposes herein set forth.

72,794.—PEACH PARER.—James H. Brown, Mitchell, Ind

I claim the curved prong, a, pivoted in its center to the arm, H, above the stationary prong, b, and its rear end resting on a spring, d, in combination with the knife supporting shaft, I, pivoted at its lower end, and working in a slot in the frame, A, all as herein shown and described.

82,795.—CHEESE CUTTER AND BOX.—Smith S. Brown, Woonsocket, R. I.

I claim a cheese box and cutter, having tables D and E, pivot, d, pin, e, cover, A, cutting wire, H, and guide, g, constructed, arranged, and operating substantially as specified.

82,796.—CURTAIN FIXTURE.—Smith S. Brown, Woonsocket, R. I.

I claim a fixture for window curtains, having roller, B, slotted plates, C D and G, with their respective thumb screws, head plate, E, swinging plate, O, pulley, Y, and cord, V, constructed, combined, and arranged substantially as herein specified.

82,797.—SASH FASTENING.—Wm. Brown, Duncannon, Pa.

I claim the device, composed essentially of the angular plate, D, with the with the shafts, E and F, bearing the slotted plates, H H, and the weighted handles, G G, when used in combination with the notches, n n, and block, I, upon a sash or door, substantially as and for the purpose specified.

82,798.—BOOT AND SHOE HEEL POLISHING MACHINE.—B. Q. Budding, Worcester, Mass.

I claim, in combination with the jack-supporting bearing or bracket, a jack, held up towards the polishing tool by a spring, substantially as set forth.

Also, in combination with the jack plate, r, the heel clamping mechanism, substantially as shown and described.

72,799.—HOISTING APPARATUS.—F. P. Canfield, Brighton, Mass.

I claim, 1st, The hoisting barrel, C, when supported independently of the fixed bearings, K K', arranged and operating substantially as shown, and for the purpose set forth.

2d, The levers, L L', when so arranged, in relation to the winding barrel, C, as to convey a portion of the weight suspended therefrom to act upon the brake device, substantially as described, and for the purpose set forth.

3d, The general arrangement of the levers, Q Q', bar, R, and guide rollers, S S', when acted upon by the lateral motion of the pull rope, T, substantially as described for the purpose set forth.

82,800.—BED BOTTOM.—John Christie, Lowell, Mich.

I claim, in a bed bottom, composed of the springs, A A, connected and constructed as described, the arrangement of the short bars, C C, cross bar, E, and slotted diagonal bar, F F, and screw, G, the whole operating as specified.

82,801.—BLIND SLAT TENONING MACHINE.—John J. Clark and Thomas Clark, Elgin, Ill.

We claim cylinder, P, provided with saws, e and e'', knives, 1 2 and 3, in combination with wheels, W and W'', constructed and arranged to operate together substantially as and for the purpose set forth.

82,802.—SLAT MACHINE.—Lyman S. Colburn, Oberlin, Ohio.

I claim, 1, The revolving heads, I, constructed with apertures therethrough, corresponding with the form of the cross section of the slat, for its insertion therein endwise, substantially as set forth.

2), The combination of the arms, H H', carrying the revolving heads, I, the wheel, X, segmental rack, J, and notched hub, f, all supported on the rock shaft, G, for operation substantially as described.

3d, The arrangement and combination of the sliding bar, M, and head, N, with the holding block, W, operating together by means of the wrist, t, toe, r, and springs, x x', substantially as shown and described.

4th, The staple holder, supported on the sliding head, N, consisting of two vertical standards, p' p'', provided with a lower outlet at right angles to their position, for the passage of and to guide a single staple, when propelled by the driver, q, substantially as set forth.

82,803.—MACHINE FOR BORING WINDOW BLINDS.—Lyman S. Colburn, Oberlin, Ohio.

I claim, 1s, the marker, m, arranged and operating in combination with the notches, e, in the under side of the feed strip, N, the pawl, q, and reciprocating frame, F, essentially as specified.

2d, The feed strip, N, pawl, w, pitman, t, and wrist, s, arranged and operating substantially as shown and described.

3d, The combination of the reciprocating spindle frame, F, the eccentric pin, k, and wrist, s, on the revolving head, J, and the pitman, t, and pawl, w, when said pin and wrist are so arranged as to raise the bits, t, into the wood as soon as the pawl, w, has finished each feed motion of the stuff, substantially as set forth.

82,804.—DOOR AND GATE CLOSER.—Henry N. Conklin, Indianapolis, Ind.

I claim a gate or door closing device, having lever, a, pivot, b, and chain, d, constructed, arranged, and operating substantially as herein specified.

82,805.—MAKING CRANK SHAFT.—Jules Converse, Paris, France.

I claim the improved method, herein described, of making crank axles, by forging them first, as usually done, in one solid piece, then boring the shouldered parts thereof, and strengthening the same by introducing separate pins, D, of steel or other strong material, embraced entirely within the metal, as and for the purposes herein set forth.

82,806.—POTATO DIGGER.—W. J. Cowan, Cortland, N. J.

I claim the combination of the slides, b b, the point or share, a, and the curved rods, c c, with the apron, d, when constructed substantially as above described and for the uses and purposes set forth.

82,807.—RAILWAY CAR COUPLING.—R. A. Cowell, Cleveland, Ohio.

I claim, 1st, The connecting bolt or pin, C, constructed with the pivots, a, and arms, x, and operating in combination with the spring, f, and slot, b, substantially as and for the purposes described.

2d, In a railway-car draw head, arranging the chamber, D, with the superior recess or apartment, E, in combination with a connecting bolt or pin, as C, having a rotary and vertical action, all constructed and operated substantially as herein described.

82,808.—MACHINE FOR GRINDING CUTTERS OF MOWING MACHINE.—C. B. Curtis, Jordan, N. Y.

I claim, 1st, A frame for supporting a cutter bar upon the frame of an ordinary grindstone, constructed with an adjustable slotted bed piece, A, and clamp hooks, B, and an oscillating support for the clutches, by which the cutter bar is secured, substantially as described.

2d, The combination of the bed piece A, so constructed that it may be adjustably attached to the grindstone frame, the side pieces, E, attached to the bed piece, so as to be vertically adjustable, and the clutches, for holding the cutter bar, substantially as described.

3d, The clutches, H, attached to the frame by crank rods, or arranged that the knives may be set at any required angle, substantially as set forth.

4th, In combination with the end clutches, an intermediate clutch, attached to an adjustable standard, and sliding upon the cross bar, G, substantially as and for the purpose set forth.

82,809.—PLOW.—S. T. Denise, Red Bank, N. Y.

I claim, 1st, The coulter, when terminating at its lower end in the point, A, and its upper end in the bent lip, e', between which is the sharp cutting edge, e, the whole being constructed substantially as described.

2d, The brace rod, F, when constructed of a single piece uniting the beam and both handles, substantially as and for the purpose specified.

82,810.—RAILROAD CAR HEATER.—Isaac Dripps, Fort Wayne, Ind.

I claim an apparatus for heating and ventilating railroad cars, combining the following elements, viz: a double funnelled hood, A, with a centrally-suspended oscillating valve, V, pipe, B, water tank, C, heater, D, with with inclosing casing, arranged as described, a pipe, E, and registers, R, and a ventilator so constructed as to create an outward draft, substantially as described.

82,811.—HOT-AIR FURNACE FOR HEATER.—J. B. Driscole, New York city.

I claim the fire-pot, A, with a horizontal extension, G, of a pyramidal or conical form, constructed and operated substantially as and for the purpose set forth.

82,812.—LIQUID METER.—Ernest Marie Du Boys, Paris, France. Antedated May 9, 1867.

I claim, in combination with the shallow gaging vessel, divided into two compartments by an elastic diaphragm, which moves to and fro therein, by the pressure of the liquid on one side and then on the other side thereof, a mechanism constructed and operated substantially as herein described, for putting the compartments in alternate communication with the entrance and exit pipes or passages, as and for the purpose herein described.

82,813.—HORSE SHOE CALK SHARPENER.—William Duncan, Vinton, Iowa.

I claim the shank or bar, A, spring, b, and cutting wheel, B, all combined and operating substantially in the manner and for the purpose specified.

82,814.—CULTIVATOR.—Daniel S. Early, Hummelstown, Pa.

I claim, 1st, The sliding bar, E, in combination with the central beam, A, the hinged side beams, D D', and the fastening, d, substantially as described and for the purpose specified.

2d, The arrangement of the beams, A D D', slide, E, clevis, F, wheel, B, handles, C C, and plows or teeth, P P P, in the manner shown and described.

82,815.—APPARATUS FOR TANNING HIDES.—Albert G. Eaton, Governeur, N. Y.

I claim, 1st, In combination with vats for tanning hides, a series of lifting pumps, arranged in and operated at the bottom of the vat, for raising the heavier and stronger liquids from the bottom to the top of the vat, and thus by mixing render it of more uniform strength throughout, substantially as described.

2d, Also, in tanning hides, the throwing of the tanning liquid against the hides, suspended in the air, by a force pump, or in a forced column or spray or jet, substantially as described.

3d, Also, in combination with a series of pumps, arranged in and operated at the bottom of the vat for raising the liquid in the bottom of the vat to the surface, an agitating or circulating pump, also arranged and operated at the bottom of the vat, for keeping the liquid mixed there, and of uniform strength, substantially as described.

4th, Also, in combination with a series of hides suspended in a vat, and at times dipped into the liquid and then raised therefrom and suspended in the air, a circulating and a lifting pump, or two or more of each, operated by or with the vibrating frame, carrying said hides, substantially as described.

82,816.—MACHINE FOR MORTISING, SLOTTING, AND DOVETAILING.—Jacob Felber, St. Louis, Mo.

I claim the combination of the arbor, B, pivoted by ball-and socket bearing at D1, and guided by ball-and-socket bearing in the sliding head, D, with said head, D, the segmental plate, D2, pendulum, D3, its slot, d2 and the pivot pin, d3, when operating substantially as and for the purpose set forth.

82,817.—WASH-BOILER.—George Fenn, Boston, Mass.

I claim the combination, with the external boiler, a, of an internal boiler, b, provided with a perforated bottom, c, cover, d, and springs, i, and surrounded at the bottom and sides with a space, h, substantially as and for the purpose set forth.

82,818.—CONSTRUCTION OF POWDER KEGS.—Joseph B. Fleming and Daniel J. Fleming, Xenia, Ohio.

We claim, 1st, The process of making sheet-metal kegs, cans, etc., as above described, the essential feature of which process consists in leaving a large opening, E E, in the head that is last attached, through which opening a mandrel is inserted, upon which to form the joint around the edges or chimes, after the removal of which the opening is closed up by means of a piece soldered over it.

2d, A keg or can, constructed as above set forth.

82,819.—MAGAZINE FIRE-ARM.—Valentine Fogerty, Roxbury, Mass.

I claim, 1st, In combination with the magazine, the rocking finger, i, for throwing the cartridge laterally from line with the magazine into line with the barrel, substantially as set forth.

2d, Throwing the finger, i, laterally forward by the rear movement of the guard lever against the arm, l, on the finger journal or rock shaft substantially as described.

3d, Throwing the finger back to its former position by the forward movement of the breech pin directly against it, substantially as described.

4th, Combining with the breech block a notch, l', for receiving the cartridge flange and for preventing undue movement of the cartridge moving forward at the side thereof, when the same, in its retrograde motion, releases one cartridge and takes the next in rotation, substantially as described.

5th, The lever, q, with its tongue, v, and tip, w, constructed substantially as shown, and operating in conjunction with spring, t, to withdraw and expel the cartridge shell and to guide the cartridge into the barrel, substantially as set forth.

6th, The combination, with lever, q, having projections, y and e', thereon, of the studs or pins, a' and d', for tripping the lever in its forward and back movements, upwards and downwards, by positive action in both directions.

7th, Connecting the lever, q, with the breech block, e, by the link, r, by means of a pin, o 2, projecting into a groove, c 2, in the block, substantially as and for the purpose set forth.

8th, Combining with the magazine slide and the breech block the pin, f', and its notched spring, for arresting positively the feed of the cartridge, substantially as described.

82,820.—ROTARY ENGINE.—Charles G. Foote, Indianapolis, Ind. Antedated September 21, 1868.

I claim, 1st, The valve, C D E, constructed substantially as set forth.

2d, The combination of all the parts described in one device, constructed in the manner and for the purpose substantially as set forth.

82,821.—BUCKLE.—Merwin Fowler, Wolcottville, Conn.

I claim a buckle, consisting of the frame, A, the loop, B, and tongues, C C, the said loop and tongues being formed in one piece, and hinged to the frame, so as to be retained in their proper relative position, substantially as herein set forth.

82,822.—GRAIN DRILL.—C. O. Gardiner (assignor to J. H. Thomas and P. P. Mast,) Springfield, Ohio.

I claim, 1st, The cup, A, formed substantially as described, with the inwardly projecting flanges, e, on the inner face of its sides, as set forth.

2d, In combination with the cup, A, the cylinder, B, so constructed as to leave a space between its ribs, o, and the sides of the cup, to prevent the crushing of the grain, as described.

82,823.—BRANDING STAMP.—W. C. Garretson and Elwood Draper, assignors to W. C. Garretson, Oskaloosa, Iowa.

We claim the device herein described and set forth, consisting of the lamp, e, the stamp, a actuating lever, b, with suitable base, j, arranged substantially and to operate as described and set forth for the purposes specified.

82,824.—CURTAIN FIXTURE.—Amos F. Gerald, Kendall's Mills, Me., assignor to B. B. Belcher, Chicopee, Mass.

I claim the construction and arrangement of the cup shaped bracket, C, and the conical spiral spring, B, contained within it, and having the disk, A, rigidly attached to its smaller end, in combination with roll, R, and bracket, C', having projection, J, and tongue, D', all arranged, constructed, and operating as herein described and shown, substantially as described.

82,825.—SAW SET.—Wm. E. Goodenough, Newark, N. Y.

I claim, 1st, The combination of the guide bar, m, and adjustable frame, p, carrying the guide rollers, nn, with the stock, A, hammer, B, and adjustable guide roller, W, all arranged and operating substantially as shown and described.

2d, The spring, c, having a projection, h, and notch, i, attached to the sector, D, in combination with the stud, a, on the trigger, and adjustable stud, e, for operating together, substantially as set forth.

82,826.—SLED.—D. W. Gould, Fostoria, Ohio.

I claim a cast iron bob sled, when each side, including runners, knees, and fender, is cast entire in one piece, as herein set forth and described.

82,827.—KEY FOR HYDRANT COCK.—Patrick H. Griffin, Albany, N. Y.

I claim, as an article of manufacture, the cast metal socket, C, constructed substantially as described and for the purpose set forth.

82,828.—MACHINE FOR GRINDING AND POLISHING SCHOOL SLATES.—Stinson Hagaman, Weissport, Pa.

I claim, 1st, In combination with one or more horizontally rotating rubbing wheels, an endless belt, with slate carriages mounted thereon, for the purpose of carrying the slates under the rubbing wheel or wheels, substantially as described.

2d, In combination with one or more rubber wheels, as described, and an endless belt, for the purpose of carrying the slates, as set forth, the slate carriages, H, with their friction wheels and springs, as described.

3d, In combination with the endless belt, and slate carriages mounted thereon, as described, the ledges or tracks, l, and shoulders, t, on the rails of the machine, for the purposes set forth.

4th, The combination of the driving shaft, G, the pulley wheels, E F and F', with the endless belt, K, for rotating the rubbing wheels, and the pinion, l, worm screw, J, and pulley wheels, C and C', for carrying the endless belt, D, all arranged and operating substantially as described.

82,829.—BED BOTTOM.—Henry J. Hale, Indianapolis, Ind.

I claim the corner guide pieces, C, in combination with the friction rollers, D, hung in adjustable bearings, e, attached to the upper metallic frame, substantially as and for the purpose set forth.

82,830.—BREAST YOKE FOR DOUBLE HARNESS.—A. F. Hammel, St. Louis, Mo.

I claim, 1st, The collar, A, and yoke, B, jointed at b and b', when combined and arranged substantially as described.

2d, The swivel, C c, in combination with the breast yoke, as and for the purpose set forth.

82,831.—AUTOMATIC GATE.—Elam Harter, Dowagiac, Mich.

I claim, 1st, The combination of the gate, truck wheels, inclined bars or rails, and vibrating platform, with the levers and chains, or equivalents of the latter, by means of which pressure upon the platform causes the gates to run asunder on the inclined rails, substantially as described.

2d, The mechanism, herein described, for locking and unlocking the gate, substantially as shown and described.

82,832.—GRAPPLING IRON.—William H. Hawley, Utica, N.Y.

I claim the combination of the pulley, A, with the grappel, constructed and operating substantially as described, and for the uses and purposes mentioned.

82,833.—ROTARY PUMP.—Charles H. Hersey, Boston, Mass.

I claim the pump, constructed as described, with semi-spherical shell or body, conical diaphragm, and flat surfaced head, when the inlet and outlet passages are located and arranged as and for the purpose set forth.

Also, in combination with the parts last above named, the construction shown at 5, for the purpose specified.

82,834.—PAPER RULING MACHINE.—W. O. Hickok, Harrisburg, Pa.

I claim, 1st, Suspending the pen beam of a paper ruling machine, by means of the ball joints, D and D', in combination with sliding standards, B and B', operating together, substantially as and for the purpose described.

2d, The ball joint, D', consisting of the socket, h4, and the perforated ball therein, in combination with the stem, a''', on the end of the pen beam, the said parts operating together substantially in the manner described.

3d, In combination with the pen beam, A, and sliding ball joint, D', the solid ball joint, D, consisting of the spherical cavity within the clamp, a' a'', on the end of the pen beam, A, and the solid ball, g4, on the end of the screw, g'', the said parts being constructed and arranged to operate substantially as and for the purpose described.

4th, In combination with a pen beam, A, suspended upon the ball joints, D and D', as described, the sliding standards, B and B', operated by means of their respective screws, c''' c''', substantially as and for the purpose described.

5th, In combination with the pen beam of a ruling machine, the stem, a''', constructed and applied substantially as and for the purpose described.

82,835.—HARROW TEETH.—P. V. Hixon, Tioga, Pa.

I claim the gib, A, provided with projections, a, in combination with the shank, B, provided with corresponding indentations in all of its four faces, and tightening key, D, all constructed and operated in the manner and for the purpose set forth.

82,836.—FASTENING HORSE COLLAR.—B. H. Hobart, and D. C. Lamoman, Troy, Pa.

We claim the hollow end piece, B, provided with a spring actuated catch concealed within the same, when secured to one side of the horse collar, S, and made to fit into a socket, A, secured to the other side, the whole constituting an improved fastening for the collar, substantially as herein set forth.

82,837.—TILE MACHINE.—Asa Hockett, and Albert C. Hockett, Plainfield, Ind.

We claim the arrangement of the frame or box, A, tub, B, sliding frame, H, follower, G, gravel screen, L, and die, M, all constructed as described, and operating substantially as and for the purposes herein set forth.

82,838.—STALL FOR HORSES.—Alfred Hosmer, Watertown, Mass.

I claim the animal stall, A, when constructed and arranged substantially as and for the purpose described.

Also, the gutter, B, provided, by means of its position or form, with an inclined groove, having one or more outlets, and applied to a double or single floor, for the purpose of draining the same, substantially as described.

82,839.—BRACE FOR CARRIAGE.—Joseph Howe, Mount Pleasant, Iowa.

I claim the ring, a, ball and socket joints, c and d, and plate, b, in combination with braces, C, attached to the body of a carriage, as described, and operating as and for the purposes set forth.

82,840.—WHIP HANDLE.—Liverus Hull, Charlestown, Mass.

I claim the improved whip handle or manufacture, as having one or more knit, woven, or braided bands, laid in one or more helices, about and cemented to a braided or wound covering of thread, previously laid or formed on the stock of the handle.

Also, the combination and arrangement of the "Turks' heads," or their equivalents, the body covering of thread, and the helical bands, laid on and cemented to such body covering as set forth.

82,841.—STEAM BOILER FURNACE.—Hosea H. Huntley, Quincy, Ill.

I claim a furnace, having grate bars, C, with apertures, D, passage, G, tubes, O and K, and chambers, B H L, and M, constructed, arranged, and operating substantially as specified.

82,842.—COMBINED MEASURE AND WEIGHER.—A. B. Hurd, Watkins, N. Y.

I claim, 1st, The combination of the hook, l, with receptacle, A, and hinged balance handle, b, in the manner and for the purpose specified.

2d, The combined arrangement of the receptacle, A, stiff arm, a, hinged handle, b, with balance, f, and the hook, l, the said receptacle answering the double purpose of weighing and measuring, and the balance being adjustable by nut, k, the whole as described, and operating in the manner and for the purpose specified.

82,843.—STEAM GENERATOR.—Chas. F. Jauriet, Aurora, assignor to himself and A. J. Ambler, Chicago, Ill.

I claim the construction of the inner lining, C, and outer jacket of the door way, B, riveted together on the outside of the fire box, whereby a single sheet of metal forms the lining of the water space around the door way, and another single sheet the frame for the door, as herein set forth.

82,844.—STEAM GLOBE VALVE.—N. Jenkins, Boston, Mass.

I claim the arrangement of the bearing surface, l, of the valve head and the elastic packing, held in an annular recess in the valve head, as described, with the valve seat, f', and the raised seat, f, in the manner as shown and specified.

82,845.—SAW SET.—Abijah Johnson, West Newton, Ind.

1 claim, 1st, The reciprocating bar, B, furnished with the adjustable setting nibs, C C, and, in combination therewith, the adjustable guides, D and P, all arranged and operating substantially as set forth.

2d, Actuating the bar, B, by means of the disk, F, furnished with the cams, r and s, arranged and operating substantially as set forth.

3d, The feed mechanism, consisting of the lever, G, bent lever, H, catch, N, set screw, I, spiral springs, X and M, cam, J, and pins, t, all arranged and operating substantially as set forth.

82,846.—DITCHING AND BORING MACHINE.—I. B. Jones, Xenia, Ohio.

I claim, 1st, In combination with a ditching machine, the auger, H, constructed as described, in whole or in sections, with a cutting edge at the lower end, and the edge along its rod, turned up and sharpened, substantially as and for the purposes herein set forth.

2d, The combination of the cogged hub of the master wheel, E, feed wheel V, and miter wheel, W, for the purpose of communicating motion to the wheels, a B, substantially as herein set forth.

3d, In a combined boring and ditching machine, the shaft, Y, miter wheels, X X, pinion, b, and wheel, c, in combination with the lever, Z, and notched latch, a, substantially as herein set forth.

4th, The combination of the auger, H, sheath, T, and mold board, U, all constructed as described, and operating substantially as and for the purposes herein set forth.

5th, The screw rod, d, provided with a crank, e, at one end, and attached to the axle of the hind wheels, for the purpose of turning the machine to the right or left, substantially as herein set forth.

6th, The arrangement of the movable cross head, S, provided with a shaft and pinions, as described, and operating on rack bars and slides on each side of the auger, H, substantially as and for the purposes herein set forth.

82,847.—SASH FASTENER.—H. H. Kelley, Philadelphia, Pa.

I claim the arrangement of the elastic roller, C, and wedge, E, and operating substantially as herein represented and described.

82,848.—STOVE PIPE DAMPER.—J. C. Kennedy, Chicago, Ill.

I claim a cone, B, or its equivalent, applied to a stove pipe, substantially as described, and employed in conjunction with a register, in the manner and for the purpose set forth.

22,849.—SIGNAL FLAG FOR VESSELS.—J. F. H. King, Port Richmond, N. Y. Antedated September 25, 1868.

I claim the constructing and combining the two frame pieces, a b, and the check chain or cord, g, with the halyards, for displaying or folding a signal flag, the whole arranged and operating substantially in the manner and for the purposes described.

82,850.—FOUNTAIN PEN.—Geo. Kneip, New York city.

I claim, 1st, The ink cistern, B, provided with a central tube, d, in its receiving end, and with a valve, f, at its discharging end, in combination with the pen holder, A, constructed and operating substantially as and for the purpose set forth.

2d, The opening, e, in the sides of the pen holder, in combination with the transparent ink cistern, B, substantially as and for the purpose described.

82,851.—BORING FAUCET.—Jotham R. Lawrence and Isaac G. Johnson, Cutler, Me.

We claim a faucet having boring tool, C, core chamber, B, clamp, E, thumb screw, G, lever, F, gate, H, pin, I, and cleats, o, constructed, combined, and operating substantially as specified.

82,852.—APPARATUS FOR ATTACHING HORSES TO VEHICLES.—Charles Leroy, Mexico, N. Y.

I claim, 1st, The clips, C C, constructed as described, and secured to the shafts of the vehicle as and for the purpose described.

2d, Draft bar, A, rods or traces, B B, spiral springs, D D, and clips, C C, all combined, arranged, and operating substantially as and for the purpose set forth.

82,853.—GRAIN DRILL.—M. F. Lowth and T. J. Howe, Owatonna, Minn.

We claim, 1st, The device, consisting essentially of the shaft, G, pinion, H, bearing, J, sleeve, L, and cylinder, M, having the grooves, m m, when constructed and operating together, as described, and in connection with a driving shaft, F, seed hopper, D, and a lever, K, for moving the shaft back and forth, substantially as described.

2d, The combination of the graduated plate, N, index lever, K, and clamp, o, for conning the lever at any point of the plate, when employed in connection with the apparatus above described, and for the purpose set forth.

82,854.—ELASTIC APRON FOR PAPER MACHINE.—A. B. Lovell, Pomfret, N. Y.

I claim the combination of a rubber or gutta percha apron with the couching press rolls of a paper machine, when the same is provided with a tension roller, in the manner and for the purpose set forth.

82,855.—HORSE RAKE.—Ellis Luther, West Troy, N. Y.

I claim, 1st, The screw or twisted bar, E, with the foot, D, substantially as described.

2d, The said bar, E, and foot, D, in combination with the transverse bar, L, and apperture, a, substantially as herein specified.

3d, The said bar, E, and foot, D, in combination with the tooth, t, of the rake, substantially as specified.

4th, The windlass, N, in combination with the chain, M, and the head, A, of the rake, substantially as herein shown and described.

5th, The wheel, I, in combination with the chain M, and windlass, N, substantially as specified herein.

6th, The ratchet and pawl, c, combined with the windlass, N, and chain, M, substantially as herein set forth.

7th, The cord, b, attached to the chain, M, substantially as and for the purposes herein specified and set forth.

82,856.—INDICATOR FOR STEAM BOILERS.—Andrew J. Maris (assignor to himself and Wm. H. Burnap), New York city.

I claim the expansion tube alarm and gage cock, arranged in substantially the manner set forth.

82,857.—MODE OF ATTACHING AND DETACHING SHAFTS AND POLES OF CARRIAGES.—Leslie Marmaduke, Arrow Rock, and Sidney T. Bruce, Marshall, Mo.

We claim, 1st, The coupling heads, D a2, and the coupling block, E, when arranged and operated substantially in the manner and for the purpose herein shown and described.

2d, The arrangement of the axle piece, A, traction rods, a a1, rod, B, lever, C, and coupling heads, D a2 E, substantially in the manner shown and described.

82,858.—PLOW.—Daniel Mater, Bellmore, Ind.

I claim, 1st, The arrangement of the transversely adjustable coulter or cutter, F, with reference to the beam of the plow and shovel, C, substantially as shown and described.

2d, In combination with the beam and standards, the brace rods, H, clamps, I, and nuts, I', arranged substantially as and for the purpose set forth.

82,859.—PREVENTING INCRUSTATION IN STEAM BOILERS.—Hugh McQuade, Canyon City, Oregon.

I claim the application in steam boilers of an amalgamated surface to the parts liable to incrustation, the iron plated with copper being coated with quicksilver, and being a liquid, on the surface of the copper, expands, as herein set forth, using for that purpose the aforesaid metals, or any other substantially the same, which will produce the intended effect.

82,860.—MECHANICAL MOVEMENT.—Geo. R. Metten, Cleveland, Ohio.

I claim a balance wheel, B, constructed with a flanged hub, having a friction band, p, applied thereto, in combination with a treadle motion and vibrating pawls, c c, arranged to operate substantially as described.

82,861.—MACHINE FOR MAKING DRAIN TILES.—James W. Milroy and John Cook, Galveston, Ind.

We claim the combination and arrangement of the box, sliding block, B, shaft, C, cog wheel, b, ratchet plate, c, friction rollers, d d, and friction roller D, molds, E and F, knives, G G, and table, G', substantially in the manner and for the purposes as herein set forth.

82,862.—BROADCAST SEED SOWER.—W. H. Mitchell and J. F. Mitchell, Macomb, Ill.

We claim, 1st, The stirrers, c, operated by the compound crank, R, when arranged to operate substantially as described.

2d, The distributor, L, constructed and arranged to operate substantially as set forth.

3d, The two slides, h and f, arranged to be operated independently or jointly, as herein described.

82,863.—WINDOW SPRING.—Edward W. Munson and Wm. P. Thomas, Waterbury, Conn.

We claim the case, A, within which is arranged the bolt, C, and combined with the rod, D, constructed with a shoulder, a, and with a rose, F, the whole constructed and arranged so as to operate in the manner, substantially as specified.

82,864.—HORSE RAKE.—Geo. D. Neal, Mt. Vernon, Ohio.

I claim, 1st, The arrangement of the trap doors on the described frame, in combination with any suitable holding devices, as and for the purpose set forth.

2d, The central standard, E, connected to the rake beam and sliding through the mortise of central beam and in combination with the outer standards and arms, substantially as shown and described.

3d, In combination with such standard, the spring detent, with its catch, all constructed and operating substantially as and for the purpose set forth.

82,865.—PORTABLE FOLDING FENCE.—A. M. Olds, New York city. Antedated Sept. 26, 1868.

I claim the herein described combination, consisting of a fence constructed in pivoted panels, and supported by clamping braces, substantially as described and for the purposes set forth.

82,866.—APPARATUS FOR TREATING MILK.—Joel A. Otis and Thomas Barber, Watertown, N. Y.

We claim the arrangement of the double walled furnace, A, with the boiler, B, and flues, C C, when the furnace is made a part or extension of the boiler, and the flues are convoluted or bent back and forth, as shown, all the said parts being constructed, combined, and arranged in the manner described.

82,867.—HORSE HAY FORK.—Oscar Paddock, Watertown, N. Y.

I claim the combination with the center or claw operating bar in a fork, such as described, or a vibratory locking lever arm, arranged to catch over and press upon the head or upper end of the center bar, when the latter is depressed and connected with a tripping cord, or other suitable means for effecting its disengagement from the said center bar, substantially in the manner herein shown and set forth.

82,868.—PRUNING HOOK.—Benj. M. Parks, St. Louis, assignor to himself, A. C. Robinson, and Wm. Seymour, Louisiana, Mo.

I claim the band slide, D, when operating by the rods, d and c, the lever, C, rod, b, lever, B, the lower knife, a', against the pressure of the spring, E, and arranged in combination with the rod, A, and the hook knife, a, substantially as herein set forth.

82,869.—ICE PRESERVER.—Julia W. D. Patten, New York city.

I claim an ice pitcher, consisting of a box or coves, having an outside wall of paper or pasteboard, lined with mica on the inside, substantially as described.

82,870.—STEAM ENGINE VALVE.—Benjamin F. Perkins, Holyoke, Mass.

I claim the combination and arrangement of the lock nut, D, with the stand, A, and packing nut, C, of a globe or angle valve, substantially as herein described.

82,871.—MODE OF PRESERVING MEAT.—Dr. M. Perl, Houston, Texas.

I claim covering meat with a flexible material, when said covering is saturated with a compound prepared substantially as herein set forth.

82,872.—HARVESTER RAKE.—D. J. Powers, Madison, Wis. Antedated September 28, 1868.

I claim, 1st, The combination of a hinged, pivoted, or yielding platform, located in the rear of the cutter bar, with a gaveler or rake, operating substantially in the manner for the purpose described.

2d, The combination of lever, s, cam, p, and sweep lever, g, operating substantially as specified.

3d, The combination of the lever, a, yielding platform, B, and spring, c, so arranged that the driver, while in his seat, may adjust the spring and regulate the size of the gaveler, substantially in the manner and for the purpose set forth.

4th, The combination of gaveler, D, with swinging apron, G, when said apron and gaveler are arranged to be operated by means of cord, y, and sweep lever, g, all being arranged and operated in the manner and for the purpose set forth.

82,873.—MEDICAL COMPOUND.—John Ramsburgh, Sr., New Madrid, Mo.

I claim the improved medicine, prepared of the materials and substances as set forth.

82,874.—STEAM ENGINE GOVERNOR.—John H. Randall and Charles E. Randall, Boston, Mass.

We claim, 1st, The combination of the double acting force pump, with the pipe, b'', cylinder, l, and with the throttle valve, m, and waste pipe, n, as herein specified.

2d, The arrangement of the cock, p, with the waste pipe, h, cylinder, l, pipe, h'', and double acting force pump, substantially as herein set forth.

82,875.—CORN PLANTER.—Simon B. Reeder, Meacham, Ill.

I claim a corn planter, when the same is provided with a roller, C, having in it two or more dropping boxes, a, with springs, b, attached, which springs are operated upon by a cam catch, c, substantially as described and for the purpose specified.

82,876.—MACHINE FOR WORKING IRON.—Jacob Reese, Pittsburg Pa. Antedated October 2, 1868.

I claim, 1st, The combination of a pair of reciprocating and compressing die blocks (or jaws) with one or a pair of non reciprocating compressing die blocks (or check plates), acting perpendicularly thereto and alternately therewith, substantially as described.

2d, An arrangement of mechanism for imparting to one or both of a pair of compressing die blocks a reciprocating movement simultaneously or alternately with a movement of approach toward or recession from each other, substantially as described.

3d, In combination with one or more compressing die blocks, a pair of reciprocating and compressing die blocks, the coacting faces of which are, in their normal condition, more widely separated from one another at the point where the metal is introduced between them than at the point where the metal is extruded from them, substantially as described.

4th, In combination with one or more compressing die blocks, a pair of reciprocating compressing die blocks, the coacting surfaces of which, one or both, are curved substantially as described, for the purpose, in part, of permitting, and aiding to produce, a more or less retrograde or backward movement of the metal while the same is being acted on alternately with the general forward movement of the same, substantially as hereinbefore set forth.

5th, In combination with a pair of reciprocating and compressing die blocks, operating substantially in the manner described, an inclined feeding trough, for guiding and facilitating the forward movement of the bloom or puddle ball to and between said die blocks, substantially as herein described.

6th, As a whole the improved machine, consisting of the several parts, constructed and combined, substantially as and for the purpose described.

82,877.—PROCESS OF ELECTRO PLATING WITH NICKEL.—Wm. H. Remington (assignor to himself, Sarah A. T. Peabody, and George D. Allen), Boston, Mass.

I claim suspending or supporting or holding a mass of the particles of nickel within the solution so as to present an extended surface, and connecting them with the positive pole of the battery by means of platinum or other suitable conductor of electricity, not materially affected by the electric current or the solution employed, substantially as described.

Also, a positive electrode, composed of a plate of metal, carbon, or other conductor of electricity, upon which a coat of nickel of sufficient thickness shall have been deposited, substantially as set forth.

Also, the within described solution, prepared of the ingredients and in a manner substantially as described.

Also, a substance coated or plated with nickel, as herein set forth, as a new article of manufacture.

82,878.—LUBRICATOR.—David M. Reynolds, Port Deposit, Md.

I claim the employment, in combination with the oil vessel, having arranged in the bottom thereof an internal chamber or receptacle, so that the sediment or other impurities of the oil shall collect around said chamber, of a fibrous or other suitable filtering substance, together with a disk, whether perforated or not, but provided with a regulating screw, the whole being so arranged within said internal chamber that the filtering medium may be more or less compressed, thereby regulating both the supply of the oil and the density of the filtering medium, substantially as herein set forth.

82,879.—COLLAR FASTENING.—Charles H. L. Roberts and William C. Dudley, Morrison, Ill.

We claim the arrangement of the adjustable straps, D D, looped wires, J J and I I, with the collar A, provided with the pad, B, loop, g, and slotted housing, C, all constructed and used as and for the purposes set forth.

82,880.—BEEHIVE.—Geo. C. Schneider, Adrian, Mich.

I claim a beehive, constructed of three or more similar interchangeable sections, D D' and D'', etc., in combination with the hollow cap, A, feed box, B, opening, S, and small movable lid, b, the whole constructed and operating in the manner and for the purposes set forth and described.

82,881.—RAILROAD RAIL.—E. R. Shepard, Scranton, Pa.

I claim, 1st, A rail consisting of two sections, A B, the former having an inclined bearing below the head, adapted to the inclined edge of a rib on the lower section, and the latter having at the base an inclined bearing for the rib on the upper section, substantially as and for the purpose described.

2d, The lower section, B, with its rib, d, the upper section, A, with its slotted rib, b, inclined at the outer side, and the bolt, D, with its head bearing against the inclined side of the rib, b, the whole being constructed and arranged substantially as and for the purpose specified.

82,882.—MACHINE FOR POLISHING PAPER.—Samuel Shepherd and Ammi M. George (assignors to Samuel Shepherd and Joseph Greeley), Nashua, N. H.

We claim, 1st, The combination with any number of burnishing rolls, B, operating substantially as described, of a revolving annular bed, C, supported at or near its periphery, and of open character or construction at its center, or within its interior periphery, for operation relatively to each other essentially as and for the purpose or purposes herein set forth.

2d, The combination with a circular traveling bed, C, of a reducing emery, or other equivalent roll, D, having a rotary and longitudinal reciprocating action on or against and in contact with said bed, substantially as and for the purpose specified.

82,883.—BURNISHER FOR ENAMELED PAPER.—Samuel Shepherd and Ammi M. George (assignors to Samuel Shepherd and Joseph Greeley), Nashua, N. H.

We claim a polishing surface or device made of stoneware, substantially as specified.

82,884.—FRUIT JAR COVER.—John Siddons, Rochester, N.Y. Antedated Sept. 26, 1868.

I claim providing fruit jar covers, consisting of two metal disks, a b, with a corrugation, c, or its equivalent, for the purposes herein set forth.

82,885.—RAILROAD CAR HEATING APPARATUS.—Thos. Smith and John O. Reilley, Baltimore, Md.

We claim, 1st, The compressed air reservoirs and radiators, H, located in the passenger cars, in combination with a heating apparatus located outside of said cars, substantially as set forth.

2d, The combination of the air pump, A, compressed air receiver, B, and furnace, C, substantially as described.

3d, The combination of the pipe coupling, F, and conducting knuckle joint G, as and for the purpose set forth.

4th, The combination of the elastic conducting pipes, D E E', air forcing and heating apparatus, A B C, and reservoir, H, substantially as described.

5th, The construction and arrangement of the valve mechanism, I J K, in combination with the pipes, E', and reservoirs, H, for the purposes explained.

6th, The air conducting and discharging pipes, M N, in combination with the reservoirs, H, and cocks or valves, L, as and for the object specified.

82,886.—APPARATUS FOR CUTTING METALLIC BARS.—Theodore Snell and William Tucker, Philadelphia, Pa.

We claim, 1st, Locating the two cutting dies in their respective die stocks, so that a bar placed within them to be cut shall extend in the direction and occupy the position of the axis of rotation of one or both of said cutting dies, substantially in the manner described.

2d, In a rotary shears constructed as specified in the preceding clause, the dies, K L, made each in two parts, and pressed together by screws, C'', for the purpose of clamping the metal bars between them, as explained.

3d, The differential screw, H H', in combination with the levers, B' E, die stocks, B and C, and supporting frame, A, substantially as described.

4th, The pawl, J, and toothed segment lever, D d, in combination with the arm, E, and the stock, C, for the purpose stated.

82,887.—CANAL BOATS AND OTHER VESSELS FOR THE TRANSPORTATION OF GRAIN.—Daniel E. Somes, Washington, D. C.

I claim, 1st, A canal boat or other vessel or vehicle having a perforated lining or casing, with spaces for the circulation of air between it and the walls of the vessel or vehicle, substantially as and for the purpose set forth.

2d, A canal boat or other vessel or vehicle with a perforated false floor, with an air space between it and the bottom of the vessel or vehicle, substantially as set forth.

3d, Heating apparatus in combination with ventilating tubes, G, perforated tubes, E, and hoods, f, substantially as set forth.

4th, Perforated lining, B, ventilating tubes, G, hoods, f, openings, c, guards c1 c2, substantially as described.

5th, A canal boat or other vessel or vehicle having a perforated casing or lining, inclosing air flues and a heating apparatus, substantially as and for the purpose set forth.

6th, The perforated lining, B, perforated tubes, E, and air ducts, F, or their equivalents, substantially as described.

7th, The perforated lining, with inclined partitions, forming flues between it and the walls or bottom of the vessel, or both, substantially as described.

8th, The heating apparatus, in combination with the perforated lining and ventilating tubes, G, as set forth.

9th, The air tube, E, in combination with the ventilating tubes, G, as set forth.

82,888.—OIL CUP.—Henry Stanley (assignor to G. & W. Todd & Co.), St. Louis, Mo.

I claim the combination of the oil cup, A, stopper, a', wooden end piece, B, slotted at b2, and capped by the metallic cap, C, having the minute perforation, c, substantially as hereinbefore set forth.

82,889.—MACHINERY FOR PRINTING YARN.—Edward J. Stephens, North Providence, R. I.

I claim the contrivance and arrangement of the color carriers, F F, as shown in the drawings, and their combination with the color rollers, E E, and the fluted or ribbed rollers, A A, so as to put different colors upon different flutes or ribs of the rollers, A A, and thus to print the yarn with different colors, with distinct intervals or spaces between.

82,890.—HARVESTER.—Lyman B. Stilson, Woodland, assignor to himself and August Leich, St. Anthony, Minn.

I claim the arrangement, in a front draft machine, of the finger bar, A, and bars, B B, the latter hinged to the axle of the machine, and connected with the bar, A, as shown and described, and constructed substantially as set forth.

82,891.—MODE OF PREPARING PLASTER CASTS.—Thomas Taylor, Washington, D. C.

I claim, 1st, The use of silicate of soda or other soluble silicate, with or without glycerin, as a varnish, for the purposes as substantially set forth and described herein.

2d, The use of alkalies, or their equivalents, when used as solvents of silicates, when used substantially as in the manner herein set forth and described.

82,892.—CHURN-DASHER.—Morgan H. Thomas, Dansville, N. Y.

I claim the cone shaped top, A, perforated with holes, a a, as described, and gasher rod, B, in combination with the cross bars, C C, when the latter are hinged to the lower part of the top, A, on one side, and fastened to the opposite side of said top A, by a clasp, all arranged, constructed, and operated in the manner and for the purpose set forth.

82,893.—STEAM GENERATOR.—C. F. Trill, Baltimore, Md.

I claim, 1st, The combination of the boiler, A, with the layer or layers of wire, a a, wound around it, as described.

2d, The arrangement, within the steam generator, A, of the chambers, E F G, with the pipes, D J K, and burners, I I, substantially as described.

82,894.—TEA TRAY.—S. N. Trump, Baltimore, Md.

I claim, as a new article of manufacture, a tea tray, composed of the wooden body, A, metallic rail, B, standards, C C, and feet, D D, substantially as described.

82,895.—BOXING, BANDAGING, AND PREPARING CHEESE.—Albert M. Utley, H. N. Kimball, and William Reynolds, Watertown, N.Y.

We claim, 1st, The use, in connection with covers for the top and bottom of the cheese, of a paper bandage, encircling and permanently united, during the process of curing, with the sides of the cheese, substantially in the manner and for the purposes set forth.

2d, The combination, with the paper bandage for encircling and holding the sides of the cheese, of top and bottom flaps of cotton, or other suitable fabric, applied and used in the manner specified.

82,896.—GRAIN HARVESTER.—Medders Vanderpool, Polk county, Oregon.

I claim, 1st, The arrangement of the spiral screw, A, with the right head board of the concave, 20, whereby the standing grain is conducted to said head board without being pulled from the ground, as herein shown and described.

2d, The combination of the obliquely ribbed drums, O, ribbed concaves, 20, and spiked drums, 2 2, substantially as described, for the purpose specified.

3d, So constructing and arranging the rod, D D, provided with tapering spurs, that the standing straw is forced to the rear, to deposit the threshed grain upon the bed, X, before said straw is drawn out of the machine, substantially as herein shown and described.

4th, The combination of the ribbed drums, O O, spurred wheels, 2 2, ribbed concaves, 20, and troughs, 40, substantially as described, for the purpose specified.

82,897.—COOKING STOVE.—Nicholas S. Vedder, Troy, N. Y.

I claim, 1st, The piece, F, when constructed as and for the purposes herein described.

2d, The plate, C, forming the air chamber, E, when made sliding, as herein shown and described.

82,898.—SMUT MILL.—J. C. Waggoner, St. Louis, Mo.

I claim, 1st, The feed shoe, F, arranged with two short inclined floors, f, upon which the falling grain shall strike and from which it shall be precipitated in a "shower" upon the pocket, G1, and in combination with the superposed blast tube, G, substantially as set forth.

2d, The discharging wings, H, in combination with the curved beaters, C, acting substantially as set forth.

3d, The blast tubes, G and K, and their ducts, G2 K2, the regulating slides, L and L', and the fan, E, all acting substantially as and for the purpose set forth.

82,899.—RAILWAY CAR SEAT.—F. F. Wagner, Harrisburg, Pa.

I claim, 1st, The curved body frame, K K', connected to the arc rails, x, of the support, by means of the clips, P, and with the sliding seat, by means of the clips, P, and with the sliding seat, by means of the cams, S, pins, s, and the fulcrum rods, B O n, all constructed and arranged substantially as and for the purpose specified.

3d, The slotted connecting rods, N A, in combination with the fulcrum rods, B O B, when arranged on the sides of the sliding frame, N, K K', to effect reverse motion in the manner as herein expressed.

82,900.—Spike.—R. K. Walton, Clarington, Ohio.

I claim a spike, formed with an opening, c, through it, and a guide groove, leading from its upper end to the opening, substantially as above set forth.

82,901.—Brace and Skirt Supporter Combined.—Mrs. Ruth Ann N. Atwood Ward, Philadelphia, Pa.

I claim the improved brace and supporter, consisting of pieces, a, straps of belting, b e f, and l, and buckle straps, i and m, and elastic straps, g h k, when arranged to operate for bracing and supporting, substantially as described.

82,902.—Metallic Roofing.—Wm. Ward, Cleveland, Ohio.

I claim the metal roofing, composed of sheets of metal corr and bent, as shown in figs. 3 and 4, having flanges or lips turned thereon, as described, and used with strips, D, to form the roof, all constructed and arranged in the manner and for the purpose as described.

82,903.—Window Strip Attachment.—Winthrop Ward, Mystic Bridge, Conn.

I claim the provision, on a window strip, of spring pins, adapted to slip into tubular sockets in the window frame for the purpose of attaching said strip, substantially as described and represented.

82,904.—Felted Fabric.—J. T. Waring, Yonkers, N. Y.

Antedated September 28, 1868.

I claim the new manufacture of a tufted fabric, having tufts of wool or other fibrous materials and a felt body wholly of wool or other suitable felting material, or of mixed felting and non-felting materials, the body and tufts being made into a fabric by the process of felting in the manufacture of the fabric, substantially as hereinbefore described.

Also, the perforated tuft holders or their equivalent, in combination with the jigger board and steam box, substantially as herein described.

82,905.—Tank for Fermenting Ale, Beer, etc.—E. K. Warren, Rochester, N. Y.

I claim, 1st, The employment of the conical or inclined top, C, in combination with pontoon, A, and the conical top, B, of the two coils, E E', of water pipe, the water passing first into, E, and then upward into, E', the whole as described and for the purpose specified.

2d, The combination and arrangement, with the pontoon, A, and conical top, B, of the two coils, E E', of water pipe, the water passing first into E, and thence upward into E', the whole as described and for the purpose specified.

82,906.—Track Fastener.—Fayette M. Weller, Chicago, Ill.

Antedated September 24, 1868.

I claim the curved hook, A', to be placed on the whiffle tree, in the manner as represented by figs. 1, 2, 3, and 4, the improvement which I desire to secure by Letters Patent; hence,

Also, the curved hook, A', constructed and arranged substantially as and for the purposes herein set forth and described.

82,907.—Machine for Converting Rotary into Reciprocating Motion.—Christopher C. Welsh, Pleasant Valley, Pa.

I claim, in combination with the single set of gearing, the arrangement of the swinging lever, V, vertical connecting rod, U, rocking lever, R S, vertical arm, T, and crank, O, when constructed and operating substantially as herein represented and described.

82,908.—Breech Loading Pistol.—D Werner, St. Louis, Mo.

I claim the barrels, B, of the described pistol, provided with the catch, f, located as shown and described, and having the studs, c c, sliding upon the rod, d, and operated in connection with the spring, o, as described, when said barrels are combined with the stock and locks of an ordinary pistol, in the manner and for the purpose set forth.

82,909.—Extract of Barley Malt.—Minna Wesselhoeft, Baltimore, Md.

I claim a new article of manufacture for dietetic and remedial purposes, a concentrated extract of malt, prepared in the manner as described.

82,910.—Cooking Stove.—E. D. Weston, Taunton, Mass.

I claim the bottom plate of the air flue, as made of the five sections, c d e f g, having their joints arranged transversely and longitudinally of the top plate, and provided with overlapping flanges, h, as described, in order that the lateral and longitudinal expansion of the top plate may freely take place.

Also, when the series of partition plates of the air flue is extended partially across the space underneath the top plate, the combination of the end flanges, m m, with such plates, and the extension of the jambs and end plates of the stove body up against the said flanges, the partition and top plates, and these latter (with the partition and top plates) beyond the jambs and end plates or body of the stove, in manner as represented.

Also, the said end flanges, m m, as constructed with notches or openings, o o, for the exit of air from the air flue to the smoke flue over the oven.

82,911.—Clothes Line Adjuster.—Rudolph White, Newport, Pa.

I claim the arrangement of the spring, D, in combination with the swivel hook, A, and bearings, B B', in the manner and for the purpose set forth.

82,912.—Knife Ring.—J. C. Wilmarth and Avery Forbes, St. Louis, Mo.

We claim the combination and arrangement of the ring, A, having the stud, a, knife, a1, and shield, a2, as and for the purpose described and set forth.

REISSUES.

71,680.—Machinery for Making Tin Cans.—Dated December 3, 1867; reissue 3,143.—Christian Barry, Philadelphia, Pa.

I claim, 1st, The mode of manufacturing cans, substantially as herein described.

2d, The roll, C, with beveled edge, f, and roll, B, with flange edge, g, operating together substantially as herein described for the purposes specified.

3d, The swage or die, J, having bevel periphery, q, and swage or die, K, having a correspondingly beveled periphery, r, operating together substantially as described for the purpose specified.

4th, The shoulder, s, on the swage or disk, K, forming a gage and support, substantially as herein described and represented.

22,228.—Seed Planter.—Dated December 7, 1858; reissue 3,144.—Jarvis Case, Lafayette, Ind., for himself and Newton Baldwin, administrator of Wm. Baldwin, deceased, assignees of Jarvis Case.

I claim, 1st, A corn planter, consisting of a front and rear frame, when said frames are connected by a central bar, said connecting bar being either an extension of the driver's seat or an independent bar, substantially as described.

2d, Pivoting the rear frame to the front one by means of the forward extension of the driver's seat, connected to the post, F, or its equivalent, substantially as described.

3d, The locking bar or catch, K, pivoted to the seat bar, c, and arranged to engage under the projection, J, or its equivalent, substantially as set forth.

4th, The reversible marker, consisting of the rigid bar, L, hinged to the front frame in such a manner that its outer end shall rest upon the ground without being raised therefrom or resting on the runner while the machine is in operation, and still be raised clear from the ground when the front part of the machine is elevated, substantially as described.

5th, A runner for corn planters, having the hollow or recess n in its upper edge for the marker a seed duct, formed by cutting a channel in the side of the runner, and covering it with a plate, and also having the straight edge of the runner so inclined that its heel shall be the lowest point, substantially as and for the purposes set forth.

6th, The combination of the rock shaft, N, with the treadle or foot lever, f, applied thereto, with the seed slide, h, arranged to operate substantially as described, for the purpose of enabling the driver to operate the seed slides with his feet, as set forth.

63,051.—Refining Petroleum.—Dated March 19, 1867; antedated September 19, 1866; reissue 3,145.—Fleury Huot, New York city, assignee, by mesne assignments, of himself.

I claim, 1st, The process, herein set forth, of purifying petroleum and other liquids by mixing with the same bone black or other carbonaceous material, and then separating the said liquid from the carbonaceous substances by a centrifugal filter, substantially as and for the purposes set forth.

3d, The centrifugal filter, formed of two thicknesses of cloth, with an intervening layer of filtering paper, as and for the purposes set forth.

63,400.—Hydro-Carbon Burner.—Dated April 2, 1867; reissue 3,146.—Joel Lee, Galesburg, Ill.

I claim, 1st, Packing the conducting tube with wood, in the manner and for the purpose set forth.

2d, A gas generator, made of a coiled tube, and so arranged that the gas or vapor passes through its centre, substantially as set forth.

50,603.—Machine for Grinding and Polishing Saws.—Dated October 24, 1865; reissue 3,147.—John Lippincott, Thos. Bakewell, Benjamin P. Bakewell, and Benjamin Bakewell, Jr., Pittsburgh, Pa., assignees of Wm. J. Lippincott.

We claim a machine for grinding and polishing long saws, consisting of a grindstone supported on adjustable bearings, so as to be raised or lowered at pleasure in the manner described, and having a cylindrical support for the saw plate to rest upon as it is being ground, the axis of which is in the same vertical plane as that of the grindstone, and with one or more pairs of feed rollers having pressure screws, or their equivalent, so as to hold and guide the saw in its passage under the stone, such feed rollers being geared so as to have a positive and continuous motion on their axes in such direction as to feed the saw plate forward either with or against the motion of the revolving grindstone, substantially in the manner and for the purposes hereinbefore set forth.

44,019.—Corn Planter.—Dated August 30, 1864; reissue 3,148.—James Selby, Peoria, Ill.

I claim, 1st, The main frame, mounted on two wheels, and having the runners pivoted at their front end to the front part of the main frame, substantially as described.

2d, The levers H, connected to the hoppers or runners by the links, h, and arranged to operate as described.

3d, The hoppers, F', connected by one or more cross bars located above the main frame, B, so as to permit the hoppers and runners of the machine to be raised or lowered without elevating the front part of the main frame, substantially as described.

4th, The semi-circular cut-offs, t, constructed and arranged to operate substantially as described.

5th, The adjustable plates, I, arranged to support and regulate the position of the runners, substantially as set forth.

6th, The combination of the pivoted scrapers, O, and the adjustable plates, O', when arranged to operate as described.

79,277.—Lamp Chimney.—Dated June 23, 1868; reissue 3,149.—Michael Sweeney, Wheeling, W. Va., assignor to Sweeney, Bell & Co.

I claim, as an article of manufacture, a lamp chimney, constructed with the lens or lenses, B, one or more, in its surface, substantially shown and described.

79,050.—Convertible Lounge.—Dated June 23, 1868; reissue 3,150.—Lewis H. Baker, Tarrytown, N. Y.

I claim, 1st, The combination, with a bedstead lounge, of an extension or folding washstand, constructed and arranged substantially as shown and described.

2d, The forming of a receptacle, l, in the part, A, of the lounge with an opening, k, in the seat portion, a, for the purpose of stowing pillows when the device is not in use as a bedstead, substantially as shown and described.

3d, The hinged part, D, depressed, and the seat part, A, having its seat, a, raised, whereby a space is left between said parts for the reception of bed clothing, as heretofore shown and described.

82,202.—Manufacture of Artificial Stone.—Dated September 15, 1868; antedated September 7, 1868; reissue 3,151.—William K. Boyle, Bladensburg, Md.

I claim, 1st, The herein described improvement in artificial stone, by which an insoluble silicate of lime is formed by the double decomposition of the silicates of potassa or soda and nitrate of lime, substantially as herein set forth.

2d, The herein described method of forming artificial stone, by the use of an alkaline silicate and nitrate of lime, when the latter salt is recovered, and the washings treated in the manner described, so as to utilize the acid element or recover the nitrates for the market.

3d, The utilization of all the salts left in the residual liquors, as herein described, whereby a continuous formation of nitrate of potassa or soda is kept up.

45,910.—Oscillating Valve.—Dated January 17, 1865; reissue 3,152.—Guy Davis, Syracuse, N. Y.

I claim, 1st, An oscillating valve suspended upon adjustable bearings, substantially as shown and described.

2d, The steam chamber, D, constructed substantially as shown and described.

3d, The arrangement of the steam passages, J E K and G, substantially as shown and described.

4th, The arrangement of the exhaust apparatus, T, with reference to the apertures, G G', substantially as shown and described.

77,054.—Centrifugal Machine for Draining Sugar, etc. Dated April 21, 1868; reissue 3,153.—Hugh W. Lafferty and Robt. Lafferty, Gloucester, N. J.

We claim, 1st, In combination with the swinging revolving shaft, S, of a centrifugal draining machine, an elastic stay applied to said shaft, at a point intermediate between its flexible joint or bearings and its attached cylinder, substantially as herein set forth.

2d, The combination of a fixed hollow shaft, H S, with the suspending and driving shaft, S, of a centrifugal machine, to afford stay or support thereto, substantially as herein set forth.

3d, The combination of an extended elastic ring or band, D, D', with the outer upper end of a fixed auxiliary stay shaft, H S, combined with the revolving shaft, S, of a centrifugal machine, to form a seat and stay for the same, substantially as herein specified.

4th, The combination of the conical divided washer, C' O', encircling the shaft, S, with a conical seat, C O, in the end of and enclosing shaft H S, and with a hollow nut, H N, working against said washer, substantially as herein set forth.

5th, A friction brake, B', operating against the lower end of the driving suspending shaft, S, of a centrifugal machine, substantially as herein set forth.

6th, The combination of the lower extended extremity of the driving and suspending shaft, S, of a centrifugal machine with the bottom of the casing thereof, substantially as herein set forth.

7th, The combination of a waste cup, c', with the shaft or spindle, S, of a centrifugal machine, to prevent the passage of oil down into the basket or cylinder thereof, substantially as herein set forth.

15,775.—Lubricator.—Dated September 23, 1856; reissue 3,154.—Edward Miller, Meriden, Conn., assignee of Norman W. Pomeroy.

I claim a lubricator, the disk of which, forming the bottom thereof, is constructed so that the central part may be readily pressed inward, and returned to its original position when relieved from pressure, the said bottom being so attached to the cup as to be protected by the edge of the cup, substantially in the manner herein set forth.

70,614.—Harvester.—Dated Nov. 5, 1867; reissue 3,155.—Amos Rank, Salem, Ohio.

I claim, 1st, The combination, substantially as set forth, of a vibrating platform, with a scraper hinged to the outer divider, which removes the discharged gravel out of the way of the team in cutting the succeeding swath.

2d, The combination of a vibrating platform, composed of slats supported at one end only, with a scraper hinged to the outer divider, which clears the track for the next round.

3d, The combination of a vibrating platform, connected with the main frame, through the medium of the finger beam only, with a scraper hinged to the outer divider, which removes the discharged gravel out of the way of the team in cutting the succeeding swath.

4th, The combination of a finger beam with a flexible track clearer or scraper, having its forward end hinged to the finger beam, and its rear end suspended by a flexible connection from the main frame.

53,693.—Syrup Filter.—Dated April 3, 1866; reissue 3,156.—Marvin Washburn & Co., Clinton, Ill., assignees of James L. Smith.

We claim the filter herein described, composed of raw wool, F, suspended between the funnel or other shaped sieve, D, and sieve, B, in the skeleton hemispherical frame, H C, within a suitable case, A, for syrup, oil, liquors, and fluids, all substantially as specified.

81,237.—Composition for Tanning.—Dated Aug. 18, 1868; reissue 3,157.—Ira Wood, Woodstock, Vt.

I claim, 1st, A tanning liquid made of the leaves of the different varieties of the oak, or maple, or willow, or beech trees, used separately, or combined with each other, or two, or more, or all, in equal or in any proportions, for the purpose and in the manner above set forth.

2d, A tanning liquid made of the leaves of the different varieties of the oak, or maple, or willow, or beech trees, used separately, or two, or more, or all of them together, in combination with alum, glauber's salts, and nitric acid, in about the proportions specified, and for the purpose and in the manner above set forth.

Inventions Patented in England by Americans.

[Compiled from the "Journal of the Commissioners of Patents."]

PROVISIONAL PROTECTION FOR SIX MONTHS.

2,743.—Compass.—D. B. Stronse, Salem, Va. Sept. 5, 1868.

2,747.—Frog Plate.—Joseph Wood, Red Bank, N. J. Sept. 7, 1868.

2,755.—Knitting and Knitting Machinery.—M. L. Roberts, New Brunswick, N. J., and Fergus Peulston, New York city. Sept. 7, 1868.

Receipts.—When money is paid at the office for subscriptions, a receipt for it will be given, but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona-fide* acknowledgment of their funds.

City Subscribers.—The Scientific American will be delivered in every part of the city at $4 a year. Single copies for sale at all the News Stands in this city, Brooklyn, Jersey City, and Williamsburg, and by most of the News Dealers in the United States.

BOOKS
Which are Books.

The Practical Draughtsman's Book of Industrial Design and Machinists' Drawing Companion. By M. Armengaud, the elder, and M. M. Armengaud, the younger, and Armoutoux. Edited by Wm. Johnson, Assoc. Inst. C. E. Illustrated by 50 folio steel plates and 50 wood cuts, 4to.....$10 00

A Practical Treatise on Mechanical Engineering, comprising metallurgy, moulding, casting, forging, tools, workshop machinery, mechanical manipulation, manufacture of steam engines, etc. By Francis Campin, C. E. To which are added observations on the construction of steam boilers, and remarks upon furnaces used for smoke prevention, with a chapter on explosions. By R. Armstrong, C. E., and John Bourne. Rules for calculating the change wheels for screws on a turning lathe, and for a wheel cutting machine. By J. La Nicca. Management of steel, including forging, hardening, tempering, annealing, shrinking, and expansion. And the case-hardening of iron. By G. Ede. 8vo. Illustrated with 29 plates and 100 wood engravings.....$5

The Practical Metal-Worker's Assistant, comprising metallurgic chemistry; the arts of working all metals and alloys; forging of iron and steel; hardening and tempering; melting and mixing; casting and founding; works in sheet metal; the processes dependent on the ductility of the metals; soldering, and the most improved processes and tools employed by metal workers. With the application of the art of electro-metallurgy to manufacturing processes. By Oliver Byrne. A new, revised, and improved edition, with additions by John Scoffern, M. D., William Clay, William Fairbarn, F. R. S., and James Napier. With 592 engravings. 8vo., 652 pages.....$7 00

Manual of Electro-Metallurgy, including the application of the art to manufacturing processes. By James Napier. Fourth American, from the fourth London edition, revised and enlarged. Illustrated by engravings. In one volume. 8vo.....$2

A Treatise on Steel, Comprising the Theory, Metallurgy, Properties, Practical Working, and Use. Translated from the French of H. C. Landrin, Jr., C.E. With notes, by A. A. Fesquet, Chemist and Engineer. With an Appendix on the Bessemer and Martin processes for manufacturing Steel, from the Report of Abram S. Hewitt, U. S. Commissioner to the Universal Exposition, Paris, 1867. Illustrated. 12mo.....$3.

The Practical Brass and Iron Founder's Guide. A Concise Treatise on Brass founding, moulding, the metals and their alloys, etc.; to which are added recent improvements in the manufacture of iron, steel by the Bessemer process, etc., etc. By Jas. Larkin. Fifth edition, revised, with extensive additions. 12mo.....$2 25

Pocket-Book of Useful Formulæ and Memoranda for Civil and Mechanical Engineers. By G. L. Molesworth. Pocketbook form.....$2

The Modern Practice of American Machinists and Engineers, including the construction, application, and use of drills, lathe tools, cutters for boring cylinders, and hollow work generally, with the most economical speed of the same, the results verified by actual practice at the lathe, the vice, and on the floor. Together with workshop management, economy of manufacture the steam engine, boilers, gears, belting, etc., etc. By Egbert P. Watson, late of the "Scientific American." Illustrated by eighty-six engravings, 12mo.....$2 50

The Principles of Mechanism and Machinery of Transmission. Comprising the principles of Mechanism, wheels, and pulleys, strength and proportions of shafts, couplings of shafts, and engaging and disengaging gear. By William Fairbairn, Esq. Illustrated by over 150 woodcuts.....$2 50

The above or any of my Books sent by mail free of postage, at publication price.

☞ My new Catalogue edition of Aug. 15, 1868, 56 pages 8vo, sent free of postage to any one who will forward his address.

HENRY CAREY BAIRD,
Industrial Publisher,
15 2 406 Walnut street, Philadelphia.

IMPORTANT
TO OWNERS OF
Steam Boilers.

THE METROPOLITAN LOCK VALVE CO., of the City of New York, Manufacturers of the

CELEBRATED DOUBLE SEATED LOCK SAFETY VALVE.

This Valve is adopted and recommended by the U. S. Government, and by Inspectors-in-Chief and Deputies of several States, as filling all the requirements of the laws in relation to Steam Boilers, and as being superior to any other. It costs the same as the single disc valve, and has nearly double the capacity, therefore it is much cheaper. Endorsed by the highest engineering talent of the country.

For further particulars address

JOHN ASHCROFT,
Treas. and Supt.
50 & 52 John St., New York

4

LATHE CHUCKS HORTON'S PATENT—from 4 to 36 inches. Also for car wheels. Address E. HORTON & SON, Windsor Locks, Conn.
6 13* tf

POWER LOOMS. Improved Drop Box, Spooling, Winding, Beaming, Dyeing and Sizing Machines, Self-Acting Wool Scouring Machines, Hydra Extractors. Also, Shafting, Pulleys, and Self Oiling Adjustable Hangers, manuf'd by THOS. WOOD, 206 Wood st., Phil'a, Pa.
9 13

JUST PUBLISHED—THE INVENTOR'S and MECHANIC'S GUIDE.—A new book upon Mechanics, Patents, and New Inventions. Containing the U. S. Patent Laws, Rules and Directions for doing business at the Patent Office; 112 diagrams of the best mechanical movements, with descriptions; the Condensing Steam Engine, with engraving and description; How to Invent; How to Obtain Patents; Hints upon the Value of Patents; How to sell Patents; Forms for Assignments; information upon the Rights of Inventors, Assignees and Joint Owners; Instructions as to Interferences, Reissues Extensions, Caveats, together with a great variety of useful information in regard to patents, new inventions and scientific subjects, with scientific tables, and many illustrations. 108 pages. This is a most valuable work. Price only 25 cents. Address MUNN & CO. 37 Park Row, N. Y.

A MESSIEURS LES INVENTEURS—Avis important. Les inventeurs non familiers avec la langue Anglaise, et qui préféreraient nous communiquer leurs inventions en Français peuvent nous addresser dans leur langue natale. Envoyez nous un dessin et une description concise pour notre examen. Toutes communications serons reçus en confidence.

MUNN & CO.,
Scientific American Office No. 37 Park Row New York

MODELS, PATTERNS, EXPERIMENTAL, and other Machinery. Models for the Patent Office, built to order by HOLSKE MACHINE CO., Nos. 528, 530, and 532 Water street, near Jefferson. Refer to SCIENTIFIC AMERICAN office. 4 tf

Sault's Patent

FRICTIONLESS Locomotive Valves, easily applied; requires no packing.
12 tf M. & T. SAULT COMPANY, New Haven, Conn

HOMINY AND SAMP MILLS.—The only Self-Feeding, Discharging, and Separating Mill in use. For Mills and Territory, address
12 6*tf J. DONALDSON, Rockford, Ill.

Lucius W. Pond,

IRON and Wood working Machinery Machinists' Tools and supplies, Shafting, Mill Gearing, and Jobbing. Also, Sole Manufacturer of TAFT'S CELEBRATED PUNCHES & SHEARS, (Works at Worcester, Mass.) 98 Liberty st., New York.
14 tf

CAMDEN
Tool and Tube Works,

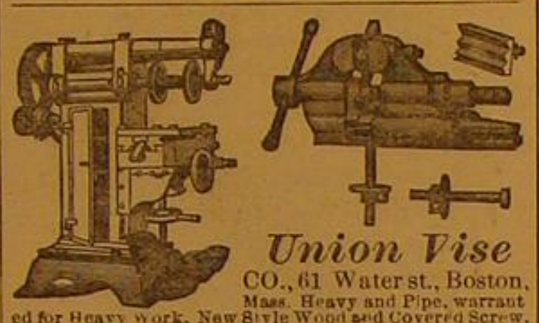
CAMDEN, N. J. Manufacturers of WROUGHT IRON Welded Tube for Steam, Gas, and Water, and all the most Improved Tools for Screwing, Cutting, and Fitting Tube by Hand or Steam Power. Sole Manufacturers of Peace's Patent Adjustable Pipe Tongs, Clean-cutting Pipe Cutter. Also, Gas-pipe Screwing Stocks, polished. No. 1 Stock Screws ¼, ⅜, ½, ¾ Tube, price complete, with dies, $10. No. 2 do., 1, 1¼, 1½, 2 do., do., $20. No. 3 do., both screws and cuts off, 2½, 3, 3½, 4, do., do., $65.
11 13*

OIL! OIL!! OIL!!!

FIRST PREMIUM.....PARIS, 1867
Grand Silver Medal and Diploma!
WORLD'S FAIR—London, 1862.
TWO PRIZE MEDALS AWARDED

PEASE'S IMPROVED OILS!

Engine, Signal, Lard, and Premium Petroleum is the Best Made for
Railroads, Steamers, and for Machinery and Burning.
F. S. PEASE, Oil Manufacturer,
Nos. 61 and 63 Main street, Buffalo, N. Y.
N. B.—Reliable orders filled for any part of the world.
1 tf



Union Vise

CO., 61 Water st., Boston, Mass. Heavy and Pipe, warranted for Heavy Work. New Style Wood and Covered Screw. Milling Machines, simple, great capacity, two sizes 2,300 and 960 lbs.
G. H. NOTT, President.
A. H. BRAINARD, Superintendent. 10 13* tf

FIRE EXTINGUISHER
ALWAYS READY FOR INSTANT use. Indorsed by the Government, the entire *Insurance Companies* and all Chiefs of Fire Departments. It has saved over 500 buildings in various parts of the country. Every house should have it. Price $45, No. 1; $50 No. 2; $55, No 3. Send for circular,
U. S. FIRE EXTINGUISHER CO.,
8 Dey street, New York, or
11 8 95 Water street, Boston, Mass.

A BOOK THAT EVERYBODY SHOULD HAVE.

WELLS' EVERY MAN HIS OWN LAWYER AND BUSINESS FORM BOOK,

Is a Complete and Reliable Guide in all matters of Law and Business Transactions for EVERY STATE IN THE UNION.

THE ENTIRE LEADING PRESS OF THE COUNTRY unqualifiedly endorse the work. We make a few short extracts from the press:

"As a legal adviser always at hand to instruct the reader how to proceed in suits and business transactions of every and all kinds; as a form book to enable the least learned to draw up deeds, mortgages, agreements leases, orders, wills, etc.; as a guide with regard to the laws of the various States concerning exemptions, liens, limitation of actions, collection of debts, usury, and so on, this volume is certainly invaluable to men of business, and it is not surprising that a hundred thousand copies have so soon found their way into the homes and country houses of the multitude. In addition, the work contains a full digest of the action of the Government relative to reconstruction and the freedmen, the General Bankrupt Law, the Patent Laws, Pension Laws, the Homestead Laws, the Internal Revenue Laws, etc. The publisher has determined to make this work complete, and, to our thinking, he has succeeded. No business man or woman can with safety be without it."—New York Times.

"This work is one of the most valuable issues of the press of this country. It contains so much that every man in business should know, but which none have the time to acquire from voluminous works, that it is truly indispensable."—New York Dispatch.

"Such a useful book can not be too highly commended. A more comprehensive digest could not be desired."—New York Weekly Tribune.

"There should be a copy of it in every family."—New York Weekly.

"The most implicit confidence can be placed upon the work as authority on all the subjects of which it treats."—Philadelphia Age.

"You can purchase in this book what may be worth hundreds of dollars to you."—St. Louis Dispatch.

"It contains just the kind of information every business man stands most in need of."—Sunday Mercury.

"Every man no matter what his business may be, should have a copy."—Pittsburgh Dispatch.

"There is no better book of reference."—Phrenological Journal.

"The book is prepared to meet all the ordinary contingencies of business life, and it meets them clearly distinctly and well."—Round Table.

"It contains a vast amount of just such matter as every one ought to be acquainted with in the prosecution of all ordinary business."—N. Y. Christian Advocate.

"It is the best business guide ever published."—De Bow Journal, St. Louis.

"Every one should have a copy."—N. Y. Eve. Post.

"It is invaluable."—Cincinnati Enquirer.

"Indispensable to every household."—Cincinnati Commercial.

"This work is worthy of the popularity it has acquired as a convenient and reliable manual."—N. Y. Herald.

The work is published 12 mo, size, 650 pages. Price in full leather binding $2 50, in half library $2 00. Sent postpaid on receipt of price.

Agents wanted everywhere.—Address
B. W. HITCHCOCK, Publisher
98 Spring street, N. Y.

PORTABLE STEAM ENGINES, combining the maximum of efficiency, durability, and economy with the minimum of weight and price. They are widely and favorably known, more than 600 being in use. All warranted satisfactory or no sale. Descriptive circulars sent on application. Address
C. HOADLEY & CO., Lawrence, Mass. 1 tf

CHARLES A. SEELY, CONSULTING and Analytical Chemist, No. 26 Pine street, New York. Assays and Analyses of all kinds. Advice, Instruction, Reports, etc., on the useful arts. 1 tf

$10 A Day for all. Stencil tool, samples free. Address A. J. FULLAM, Springfield, Vt.
7 13

WINCHESTER
Repeating Rifles,

FIRING TWO SHOTS A SECOND,
AS A REPEATER, AND
TWENTY SHOTS A MINUTE
AS A SINGLE BREECH-LOADER.

These powerful, accurate, and wonderfully effective weapons, carrying eighteen charges, which can be fired in nine seconds, are now ready for the market, and are for sale by all responsible Gun Dealers throughout the country. For full information send for circular and pamphlets to the WINCHESTER REPEATING ARMS CO.,
13 13 New Haven, Conn.

TUBE WELLS.—The Champion Well of The World.—Horner's Patent. Orders received from England and South America. State, County, and Township Rights sold. Warranted to operate where others fail. Address,
13 13* W. T. HORNER, Buffalo, N. Y.

PAGE'S GREAT WATER FLAME Coal, Patented Lime Kiln will burn No. 1 finishing lime with any coal or wood, mixed or separate, in same kiln. Rights for sale by C. D. PAGE, Rochester, N. Y.
24 26*

ALCOTT'S CONCENTRIC LATHES.—For Broom, Hoe, and Rake Handles, Chair Rounds, etc., and all other kinds of Wood-working Machinery, for sale by S. C. HILLS, 12 Platt st., New York. 1 tf a

HOISTING APPARATUS FOR MINES, etc., with our Patent Friction Clutches attached with a variety of sizes of Drums and Gearing, manufactured by V. W. MASON, & CO., Providence, R. I. Also,
1 mthly TAPLIN, RICE & CO., Akron, Ohio.

CHILLED ROLLS,

RUBBER CALENDERS,
GRINDERS, ETC.
IRON, BRASS, COPPER, AND BRITANNIA ROLLING MILLS.

Heavy Mill Gearing, Shafting, Hangers, and Pulleys. Power and Hand Presses, Trip Hammers, Shears, Hydraulic Pumps, and Iron and Composition Castings of every description, manufactured by the

FARREL FOUNDERY AND MACHINE CO.,
11 14&17* tf ANSONIA, CONN.

BEACH'S PATENT SCREW CUTTING AND LATHE TOOL.—The best and only practical tool in the country. For sale by A. J. WILKINSON & CO.,
15 4eow No. 2 Washington st., Boston, Mass.

Brick Machine.

LAFLER'S NEW IRON CLAD has more advantages combined in one machine than any other ever invented. It makes common brick of very superior quality. By a slight change, press brick are made without repressing. With Lafler's Patent Mold, beautiful stock brick are made. This machine was awarded first premium at the N. Y. State Fair, 1867, for making Front Bricks. Examining Committee awarded special report, indorsing this machine. For descriptive circular address
15 tf eow J. A. LAFLER & CO.,
Albion, Orleans county, N. Y.

Charles W. Copeland,

CONSULTING & SUPERINTENDING Mechanical Engineer, No. 171 Broadway.—Giffard's Injectors, Steam and Vacuum Gauges, Blast Pressure Gauges, Salinometers, Damper Regulators, Water Gages, Hydraulic Jacks, Dimpfel's Patent Fan Blower. Roebling's Wire Rope for sale. 15 eow

PLATINUM. H. M. Raynor, 743 Broadway, N. Y.
13 6*eow

AMERICAN TINNED SHEET IRON.
Coating uniform over the entire sheet, by an entirely new and patented process. All sizes and gages on hand and made to order.
H. W. BUTTERWORTH
9 eow tf 29 and 31 Haydock st., Philadelphia, Pa.

MERRICK & SONS,
Southwark Foundery,

430 Washington Ave., Philadelphia, Pa.,

MANUFACTURE NASMYTH & DAVY STEAM HAMMERS.

CORNISH PUMPING, BLAST, HORIZONTAL, VERTICAL, AND OSCILLATING ENGINES.

Gas Machinery of all descriptions.

Sugar Refineries, fitted up complete, with all modern apparatus.

New York office
62 Broadway.
11 eowtf

FOR BRASS LATHES and all Machinery connected with Brass Finishing and Fitting Line. Improved Lathes for making large valves etc. Address Exeter Machine Works, Exeter, N. H. 11 eow f

SUB-MARINE ARMOR.

ANDREW J. MORSE & SON,
11 9 eow* 40 Congress st., Boston, Mass.

Priest's Ready Solder.

The only Patent issued. All persons are cautioned against infringements. Samples sent on receipt of 25 cents. For sale everywhere. Agents wanted. Sole proprietors, W. W. BEAUCHAMP & CO., No. 40 Hanover st., Boston, Mass. 11 tf

Bridesburg Manf'g Co.,

Office No. 63 North Front Street,
PHILADELPHIA, Pa.,

Manufacture all kinds of Cotton and Woolen Machinery including their new

Self-Acting Mules and Looms.

Of the most approved style. Plan drawn and estimate furnished for factories of any size. Shafting and mill gearing made to order. 9 13*

SHINGLE & HEADING MACHINE.—Law's Patent. The simplest and best in use. Shingle Heading, and Stave Jointers, Stave Cutters, Equalizers, Heading Turners, Planers, etc. Address
17 tf TREVOR & CO. Lockport, N. Y.

WOODWORTH PLANERS A SPECIALTY—From new patterns of the most approved style and workmanship. Wood-working Machinery generally. Nos. 24 and 26 Central, corner Union street, Worcester, Mass.
16 tf. WITHERBY RUGG & RICHARDSON.

STEAM HAMMERS, TURN-TABLES, and Foundery Cranes. Address
14 tf GREENLEAF & CO., Indianapolis, Ind.

U. S. PATENT OFFICE,
Washington, D. C., Oct., 3d, 1868.

Marshall Burnett and Charles Vander Woerd, Boston, Mass., having petitioned for an extension of a patent granted them on the 2d day of January, 1855, for an improvement in "Grain and Grass Harvesters," it is ordered that said petition be heard at this office on the 14th day of December next.

Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.
17 3 S. H. HODGES, Acting Commissioner of Patents.

U. S. PATENT OFFICE,
Washington, D. C., Oct 3, 1868.

Lysander Wright, of Newark, N. J., having petitioned for the extension of a patent granted him on the 2d day of January, 1855, for an improvement in "Sawing Machine," it is ordered that said petition be heard at this office on the 14th day of December next.

Any person may oppose this extension. Objections, depositions, and other papers should be filed in this office twenty days before the day of hearing.
17 3 S. H. HODGES, Acting Commissioner of Patents.

U. S. PATENT OFFICE,
WASHINGTON, D. C., Oct. 2d, 1868.

Ambrose Foster, of Lauraville, Md., for himself and the representatives of J. A. Messenger, deceased, having petitioned for an extension of the patent granted the said Ambrose Foster, on the 16th day of January, 1855, for an improvement in "Building Blocks," it is ordered that the said petition be heard at this office on the 21st day December next.

Any person may oppose this extension. Objections, depositions, and other papers should be filed in this office twenty days before the day of hearing.
17 3 S. H. HODGES, Acting Commissioner of Patents.

U. S. PATENT OFFICE,
WASHINGTON, D. C., Sept. 12, 1868.

Martin P. M. Cassity, of Granada, Kansas, administrator of the estate of Isaac H. Steer, deceased, having petitioned for an extension of the patent granted to Henry Carter, assignee of said Steer, the 19th day of June, 1855, antedated the 19th day of December, 1854, for an improvement in "Making Nuts," it is ordered that said petition be heard at this office on the 12th day of December next.

Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.
17 3 S. H. HODGES, Acting Commissioner of Patents.

U. S. PATENT OFFICE,
WASHINGTON, D. C., Sept. 24, 1868.

P. W. Mackenzie, of Orangeville, N. Y., having petitioned for an extension of the patent granted him on the 2d day of January, 1855, for an improvement in "Machine for Blowing Blasts" etc., it is ordered that said petition be heard at this office on the 14th day of December next.

Any person may oppose this extension. Objections, depositions, and other papers should be filed in this office twenty days before the day of hearing.
16 3 S. H. HODGES, Acting Commissioner of Patents.

U. S. PATENT OFFICE,
WASHINGTON, D. C., Sept. 26, 1868.

Allen B. Wilson, of Waterbury, Conn., having petitioned for an extension of the patent granted to him on the 19th day of December, 1854, for an improvement in "Sewing Machines," it is ordered that said petition be heard at this office on the 7th day of December next.

Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.
16 3 S. H. HODGES Acting Commissioner of Patents.

U. S. PATENT OFFICE,
WASHINGTON, D. C., Sept 25th, 1868.

Jesse W. Hatch and Henry Churchill, of Rochester, N. Y., having petitioned for an extension of the patent granted to them on the 2d day of January, 1855, and reissued on the 24th day of July, 1866, for an improvement in "Machines for Cutting Boot and Shoe Soles," it is ordered that said petition be heard at this office on the 14th day of December next.

Any person may oppose this extension. Objections, depositions, and other papers should be filed in this office twenty days before the day of hearing.
16 3 S. H. HODGES, Acting Commissioner of Patents.

U. S. PATENT OFFICE,
WASHINGTON, D. C., Sept. 18, 1868.

Thomas Slaight, of Newark, N. J., having petitioned for an extension of the patent granted him on the 2d day of January, 1868, for an improvement in "Padlocks," it is ordered that the said petition be heard at this office on the 14th day of December next.

Any person may oppose this extension. Objections, depositions, and other papers should be filed in this office twenty days before the day of hearing.
15 3 ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE,
WASHINGTON, D. C., Sept. 9, 1868.

Sylvanus Sawyer, of Fitchburg, Mass., having petitioned for an extension of the patent granted to him on the 24th day of June, 1851, for an improvement in "Machinery for Cutting Rattan," etc., (this application having been authorized by act of Congress, March 3, 1867), it is ordered that the said petition be heard at this office on the 24th day of December next.

Any person may oppose this extension. Objections, depositions, and other papers should be filed in this office twenty days before the day of hearing.
15 3 ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE,
Washington, D. C., Sept. 21, 1868.

Joseph S. Winsor, of Providence, R. I., having petitioned for the extension of the patent granted him on the 2d day of January, 1855, for an improvement in "Machines for making Weavers' Harness," it is ordered that said petition be heard at this office on the 14th day of December next.

Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.
15 3 S. H. HODGES, Acting Commissioner of Patents.

U. S. PATENT OFFICE,
Washington, D. C., Sept. 23, 1868.

Sylvanus Sawyer, of Fitchburg, Mass., having petitioned for the extension of a patent granted him the 2d day of January, 1855, for an improvement in "Machine for Splitting Rattans into Strips," it is ordered that said petition be heard at this office on the 14th day of December next.

Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.
15 3 S. H. HODGES, Acting Commissioner of Patents.

Zur Beachtung für deutsche Erfinder!

Nach dem neuen Patentgesetze können Deutsche unter denselben Bedingungen wie Bürger der Vereinigten Staaten, ihre Erfindungen sich durch Patente sichern.

Die Patentgesetze nebst den Regeln und Instructionen der Patentämter und anderer nützlichen Informationen werden versandt an Alle gegen Erlegung von 25 Cents versandt. Patente für neue Erfindungen werden von uns in den Ver. Staaten, sowie in Europa pünktlich besorgt.

Man adressire

Munn & Co.,
37 Park Row, N. Y.

PATENT CLAIMS.—Persons desiring the claim of any invention, patented within thirty years, can obtain a copy by addressing a note to this office, giving name of patentee and date of patent, when known, and inclosing $1 as a fee for copying. We can also furnish a sketch of any patented machine to accompany the claim, at a reasonable additional cost. Address MUNN & CO. Patent Solicitors, No. 37 Park Row, New York.

PATENTS

The First Inquiry that presents itself to one who has made any improvement or discovery is: "Can I obtain a Patent?" A positive answer can only be had by presenting a complete application for a Patent to the Commissioner of Patents. An application consists of a Model, Drawings, Petition, Oath, and full Specification. Various official rules and formalities must also be observed. The efforts of the inventor to do all this business himself are generally without success. After a season of great perplexity and delay, he is usually glad to seek the aid of persons experienced in patent business, and have all the work done over again. The best plan is to solicit proper advice at the beginning.

If the parties consulted are honorable men, the inventor may safely confide his ideas to them; they will advise whether the improvement is probably patentable, and will give him all the directions needful to protect his rights.

Messrs. MUNN & CO., in connection with the publication of the SCIENTIFIC AMERICAN, have been actively engaged in the business of obtaining patents for over twenty years—*nearly a quarter of a century*. Over Fifty thousands inventors have had benefit from our counsels. More than one third of all patents granted are obtained by this firm.

Those who have made inventions and desire to consult with us, are cordially invited to do so. We shall be happy to see them in person, at our office, or to advise them by letter. In all cases they may expect from us an *honest opinion*. For such consultations, opinion, and advice, *we make no charge*. A pen-and-ink sketch, and a description of the invention should be sent, together with stamps for return postage. Write plainly, do not use pencil nor pale ink; be brief.

All business committed to our care, and all consultations, are kept by us *secret and strictly confidential*. Address MUNN & CO., 37 Park Row, New York.

Preliminary Examination.—In order to obtain a Preliminary Examination, make out a written description of the invention in your own words, and a rough pencil or pen-and-ink sketch. Send these with the fee of $5 by mail, addressed to MUNN & CO., 37 Park Row, and in due time you will receive an acknowledgment thereof, followed by a written report in regard to the patentability of your improvement. The Preliminary Examination consists of a special search, which we make with great care, among the models and patents at Washington to ascertain whether the improvement presented is patentable.

In Order to Apply for a Patent, the law requires that a model shall be furnished, not over a foot in any dimensions,—smaller, if possible. Send the model by express, pre-paid, addressed to Munn & Co., 37 Park Row, N. Y., together with a description of its operation and merits. On receipt thereof we will examine the invention carefully and advise the party as to its patentability, free of charge.

The model should be neatly made of any suitable materials, strongly fastened, without glue, and neatly painted. The name of the inventor should be engraved or painted upon it. When the invention consists of an improvement upon some other machine, a full working model of the whole machine will not be necessary. But the model must be sufficiently perfect to show, with clearness, the nature and operation of the improvement.

New medicines or medical compounds, and useful mixtures of all kinds, are patentable.

When the invention consists of a medicine or compound, or a new article of manufacture, or a new composition, samples of the article must be furnished, neatly put up. Also, send us a full statement of the ingredients, proportions mode of preparation, uses, and merits.

Reissues.—A reissue is granted to the original patentee, his heirs, or the assignees of the entire interest, when by reason of an insufficient or defective specification the original patent is invalid, provided the error has arisen from inadvertence, accident, or mistake without any fraudulent or deceptive intention.

A patentee may, at his option, have in his reissue a separate patent for each distinct part of the invention comprehended in his original application, by paying the required fee in each case, and complying with the other requirements of the law, as in original applications.

Each division of a reissue constitutes the subject of a separate specification descriptive of the part or parts of the invention claimed in such division; and the drawing may represent only such part or parts. Address MUNN & CO., 37 Park Row, for full particulars.

Interferences.—When each of two or more persons claims to be the first inventor of the same thing, an "Interference" is declared between them, and a trial is had before the Commissioner. Nor does the fact that one of the parties has already obtained a patent prevent such an interference; for, although the Commissioner has no power to cancel a patent already issued, he may, if he finds that another person was the prior inventor, give him also a patent, and thus place them on an equal footing before the courts and the public.

Caveats.—A Caveat gives a limited but immediate protection, and is particularly useful where the invention is not fully completed, or the model is not ready, or further time is wanted for experiment or study. After a Caveat has been filed, the Patent Office will not issue a patent for the same invention to any other person, without giving notice to the Caveator, who is then allowed three months time to file in an application for a patent. A Caveat, to be of any value, should contain a clear and concise description of the invention, so far as it has been completed, illustrated by drawings when the object admits. In order to file a Caveat the inventor needs only to send us a letter containing a sketch of the invention, with a description in his own words. Address MUNN & CO., 37 Park Row, N. Y.

Additions can be made to Caveats at any time. A Caveat runs one year, and can be renewed on payment of $10 a year for as long a period as desired.

Quick Applications.—When, from any reason, parties are desirous of applying for Patents or Caveats, in GREAT HASTE, without a moment's loss of time, they have only to write or telegraph us specially to that effect, and we will make special exertions for them. We can prepare and mail the necessary papers at less than an hour's notice, if required.

Foreign Patents.—American inventors should bear in mind that, as a general rule, any invention that is valuable to the patentee in this country is worth equally as much in England and some other foreign countries. Five Patents—American, English, French, Belgian, and Prussian—will secure an inventor exclusive monopoly to his discovery among ONE HUNDRED AND THIRTY MILLIONS of the most intelligent people in the world. The facilities of business and steam communication are such that patents can be obtained abroad by our citizens almost as easily as at home. The majority of all patents taken out by Americans in foreign countries are obtained through the SCIENTIFIC AMERICAN PATENT AGENCY. A Circular containing further information and a Synopsis of the Patent Laws of various countries will be furnished on application to Messrs. MUNN & CO.

For Instructions concerning Foreign Patents, Reissues, Interferences, Hints on Selling Patents, Rules and Proceedings at the Patent Office, the Patent Laws, etc., see our Instruction Book. Sent free by mail on application. Those who receive more than one copy thereof will oblige by presenting them to their friends.

Address all communications to

MUNN & CO.,
No. 37 Park Row, New York City.
Office in Washington, Cor. F and 7th streets.

Patents are Granted for Seventeen Years, the following being a schedule of fees:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Reissue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay $500 on application

Advertisements.

Advertisements will be admitted on this page at the rate of $1 per line. Engravings may head advertisements at the same rate per line, by measurement, as the letter press.

PATTERN LETTERS to put on Patterns for Castings, etc. KNIGHT BROS., Seneca Falls, N.Y. 1 50*

SELF-ACTING WEATHER STRIP FOR Doors and Windows.—Patented June 4th, 1867.—The latest and best. No cutting or defacing doors; prevents rattling of windows; never gets out of order; will wear longer than any other strip in market. State and County Rights for sale. Send for circular to
17 ostf BUTLER & WARING, Patentees, Hudson, N.Y.

Ames Iron Works,

Oswewo, N. Y.,

FOR SALE OR TO RENT.

THE Long continued ill health of the proprietor makes mental relaxation necessary. These works employ about One Hundred men, are eligibly situated, and have a good business established, and to a man of some means and good ability this is a rare chance. Terms easy. H. M. AMES.
17 4os

CARVALHO'S
Steam Super Heater

SAVES Fuel, and furnishes Dry Steam, Invaluable to Manufacturers of Paper, Cotton, and Woolen Goods, Soap, Glue, Enameled Cloth, etc., in Dye and Print Works, or for Power. Address HENRY W. BULKLEY, Engineer, 79 Broadway, N. Y.
16 4os

CATALOGUES SENT FREE.
MATHEMATICAL INSTRUMENTS, 112 pages.
OPTICAL INSTRUMENTS, 72 pages.
MAGIC LANTERNS and STEREOPTICONS, 160 pp.
PHILOSOPHICAL INSTRUMENTS, 84 pages.
JAMES W. QUEEN & CO.,
16 4os 924 Chestnut st., Philadelphia, Pa.

KIDDER'S PASTILLES—A Sure Relief for Asthma. STOWELL & CO., Charlestown, Mass.
15 6os*

BEFORE BUYING WATER WHEELS, See, or send for description of Pressure Turbine, made by PEEKSKILL MAN'F'G CO., Peekskill, N. Y.
11 13os*

Ready Roofing

THE FIRST CUSTOMER IN EACH place can buy 1000 feet for $30, about ha'f price. Samples and circulars sent by mail. Ready Roofing Co., 81 Malden Lane, New York. 12 tf os

Pressure Blowers

OF ALL SIZES, for purposes where a blast is required. For particulars and circulars, address B. F. STURTEVANT, No. 72 Sudbury st., Boston, Mass.
16 tf os

THE INDICATOR APPLIED to Steam Engines. Instruments furnished and Instruction given. F. W. BACON,
1 tf 84 John st., New York.

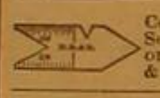
WOODWARD'S COUNTRY HOMES. 150 Designs, $1 50, postpaid, GEO. E. WOODWARD, Architect, 191 Broadway, N. Y. Send stamp for catalogue of all new books on Architecture.
9 ostf

DO YOU WANT GAS

WE can afford to pipe your house, or pay for your fixtures, or both and leave them as your property if we cannot put up a Machine that shall be perfectly satisfactory under any and every condition. Circulars and information. UNION GAS CO.,
1 os tf 14 Dey st., New York.

TWIST DRILLS, FLUTED HAND REAMERS, exact to Whitworth's gage, and Beach's Patent Self Centering Chuck manufactured by Morse Twist Drill and Machine Co., New Bedford Mass. 9 ostf

Factory, Trenton, N. J. . . . . Office, No. 2, Jacob st., N. Y.
Branch Office for Pacific coast, No. 606 Front street, San Francisco, Cal. 15 tf



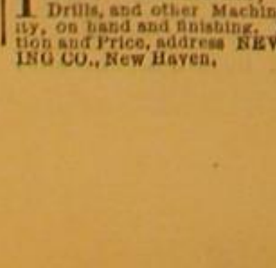
Center Gage and Gage for Grinding and Setting Screw-thread Tools. Sent per mail on receipt of 50c., by DARLING, BROWN & SHARPE, Providence, R. I. 15 3eowos

REVOLVING HEAD-SCREW MACHINE.

This Machine is suitable for making, from bar iron, all kinds of screws and studs ordinarily used in a machine shop. One man, with this machine, will produce as many screws as from three to five men can make on as many engine lathes, and they will be more uniform in size. Nuts can be drilled, tapped, and the sides faced up, and many parts of sewing machines, cotton machinery, gas and steam fittings made on this machine, with a great saving of time and labor. Size of hole through spindle 1¼ inches.

BROWN & SHARPE MF'G Co., Providence, R. I.
15 3eowos

BODINE'S JONVAL TURBINE WATER Wheel, combining great economy in the use of water, simplicity, durability, and general adaptation to all positions in which water can be used as a motive power. We are prepared to furnish & warrant the same to give more power than any overshot or other turbine wheel made using the same amount of water. Agents wanted.



Send for descriptive circular.
BODINE & CO.,
Manuf's, Mount Morris, N. York, and Westfield, Mass.
3 os tf eow

$2000 A Year and Expenses to Agents to introduce the Wilson Sewing Machine. Stitch alike on both sides. Sample on 2 weeks trial. Extra inducements to experienced agents. For further particulars, address the Wilson Sewing Machine Co., Cleveland, Ohio; Boston, Mass.; or St. Louis, Mo. 16 8 os

ROOT'S WROUGHT IRON SECTIONAL
SAFETY BOILER

Has no large sheet-iron shell to explode; is tested to 300 lbs.; economical and durable. Also ROOT'S Trunk Engines. Vertical and Horizontal Engines, all descriptions. Steam Pumps, Machinery, etc. Send for pamphlets and price lists. Agents wanted. JOHN B. ROOT,
11 13os Nos. 95 and 97 Liberty st., near Broadway.

FREE. Our New Catalogue of Improved STENCIL DIES. More than $200 A MONTH is being made with them S. M. SPENCER & CO., Brattleboro, Vt. 1 u

PATENT SOLID EMERY WHEELS, specially adapted to grinding saws, mills, and edge tools. Solid Wheels for Brass Work, warranted not to glaze. Also, Patent Emery Oil and Slip Stones, the best article in use for planer knives, Carpenter's tools, and for finishing down iron work. NORTHAMPTON EMERY WHEEL CO., Leeds, Mass. 15 3 os*

IRON PLANERS, ENGINE LATHES, Drills, and other Machinists' Tools, of Superior Quality, on hand and finishing. For Sale Low. For Description and Price, address NEW HAVEN MANUFACTURING CO., New Haven. 15 tf os

Reynolds'
TURBINE WATER WHEELS
And all kinds of MILL MACHINERY.
Send for New Illustrated Pamphlet for 1868.
GEORGE TALLCOT,
15 tf os 96 Liberty st., New York.

EAGLE ANVILS and PARALLEL CHAIN VISES.

Manufactured ONLY by
[15 26os*] FISHER & NORRIS, Trenton, N. J

CAP & Set Screws as perfect as Engine-cut Screws. Address S. C. SMITH, Lowell, Mass.
13 7os

SPOOLS FOR COTTON AND SILK, made by
11 8os* H. H. FRARY, Jonesville, Vt.

WHEATON'S OINTMENT cures the Itch
WHEATON'S OINTMENT will cure Salt Rheum.
WHEATON'S OINTMENT cures Old Sores.
WHEATON'S OINTMENT cures all diseases of the Skin.
Price 50 cents;—by mail 60 cents. All Druggists sell it.
WEEKS & POTTER, Boston, Proprietors. 1 19* os

WM. D. ANDREWS & BROTHER,
414 Water st., New York, Manufacture
Patent Smoke-burning & superheating Boilers that are safe. DRINAGE and WRECKING PUMPS, to pass large bodies of water, Sand, and Gravel. HOISTING MACHINES, Friction Grooved and Noiseless, or with Gearing. OSCILLATING ENGINES, from half to two hundred and fifty horse power. All of these Machines are Light, Compact, Durable, and Economical. 13 13os

WIRE ROPE.
Manufactured by
JOHN A. ROEBLING
Trenton, N. J.

FOR Inclined Planes, Standing Ship Rigging, Bridges, Ferries, Stays or Guys on Derricks and Cranes, Tiller Ropes, Sash Cords of Copper and Iron, Lightning Conductors of Copper. Special attention given to hoisting rope of all kinds for Mines and Elevators. Apply for circular, giving price and other information.
14 os tf

PATENT
Steam Brick Dryer.

The subscriber, having obtained Letters Patent for an improved brick drying apparatus, and believe d to be the best and most economical dryer yet offered to the public, now offers for sale, upon favorable terms, State, County, and Single Rights. Apply to
I. C. HATCH, Camden, N. J.

This is to certify that the Steam Brick Drying Kiln of Isaac C. Hatch is now in sucessful operation at our works, doing, in my opinion, all he claims for it. The bricks, afterbeing burnt, are strong and sound. A. REEVES,
16 4 "Pea Shore Steam Brick Works."

ALLEN PATENT ANTI-LAMINA Will Remove and Prevent Scale in Steam Boilers, now used in Tubular, Cylinder, and the Harrison Boilers. It has never failed. Price $5 per can.
ALLEN & NEEDLES,
15 5 41 South Water st., Philadelphia.

The Harrison Boiler.

THIS IS THE ONLY REALLY SAFE BOILER in the market, and can now be furnished at a *GREATLY REDUCED COST*. Boilers of any size ready for delivery. For circulars, plans, etc., apply to
HARRISON BOILER WORKS,
Philadelphia, Pa.; J. B. Hyde, Agent, 110 Broadway New York; or, to John A. Coleman, Agent, 53 Kilby st., Boston, Mass. 6 tfos

STOCKS, DIES, AND SCREW PLATES, Horton's and other Chucks. JOHN ASHCROFT, 50 John st., New York. 16 13

WANTED—BROWN & SHARPE'S Second-hand Screw Machines. Address box 3,825 New York Postoffice. 16 2*

WANTED—LATHE FOR TURNING Irregular Shapes in Metals. Address box 3,825 New York Postoffice. 16 2*

WROUGHT-Iron Pipe for Steam, Gas and Water; Brass Globe Valves and Stop Cocks, Iron Fittings, etc. JOHN ASHCROFT, 50 John st., N. Y. 16 13

SILICATE OF SODA AND POTASH, for Sweetening hard water in cisterns and wells; also for protecting wood and making cements water and fire-proof. For sale by the sole manufacturers,
L. & J. W. FEUCHTWANGER,
16 4 55 Cedar st., New York.

NOTICE TO STEEL, GLASS, and Patent Dryer Manufacturers.—Peroxice of Manganese, over 90 per cent, and Tungsten or Wolfram ore, in crystals or powder, for sale by the importers,
L. & J. W. FEUCHTWANGER,
16 4 55 Cedar st., New York.

ASHCROFT'S LOW WATER DETECTOR will insure your Boiler against explosion. JOHN ASHCROFT, 50 John st., New York. 16 13

FOR STEAM ENGINES BOILERS, SAW Mills, Cotton Gins, address the ALBERTSON AND DOUGLASS MACHINE CO., New London, Conn. 1 tf

EMPLOYMENT.—$15 to $30 a day guaranteed. Male or Female Agents wanted in every town—descriptive circulars free. Address
15 13 JAMES C. RAND & CO., Biddeford, Me.

HOTCHKISS ATMOSPHERIC FORGE Hammer. Will forge a 3-inch bar. Fine Machine. For sale. EDWARD HARRISON, New Haven, Conn.
15 tf

$2500 TO 3000 Per YEAR.—An Agent is wanted in every town in the Union, to make and sell an article of daily consumption in every family. It is essentially new. Sale permanent as flour. Address LOUIS COBLENTZ, Middletown, Md.
15 3*

ROBERT McCALVEY, Manufacturer of HOISTING MACHINES AND DUMB WAITERS.
15 13 602 Cherry st., Philadelphia, Pa.

B. E. LEHMAN, MANUFACTURER OF brass and iron body globe valves and cocks, gage cocks, oil cups, steam whistles. Special attention paid to heavy iron body valves for furnaces and rolling mills. Send for price list to B. E. LEHMAN,
12 9 Lehigh Valley Brass Works, Bethlehem, Pa.

A Popular Picture,
AND A
FIRST-CLASS MAGAZINE.

Messrs. DAUGHADAY & BECKER, the enterprising publishers of OUR SCHOOLDAY VISITOR, Philadelphia, have just published a large, original, finely executed steel plate engraving, entitled
GENERAL GRANT AND HIS FAMILY,
from the hand of the celebrated Sartain, which is destined to become one of the most popular pictures of the day. Six persons, three equestrian figures. Every member of the family is as faithfully likenessed as the photographs, which were given to the artist from the hands of the General himself, have power to express. This work has cost months of skilled labor, and more than ONE THOUSAND DOLLARS in cash, and readily sells for $2.50, its regular price.

This magnificent picture and a copy of
OUR SCHOOLDAY VISITOR,
one of the oldest, handsomest, and cheapest Young Folks Magazines in this country, which alone is worth $1 25 a year, will both be sent to every subscriber for 1869, for $1.50. Where clubs are formed, a still greater reduction.

The VISITOR is a live, high toned monthly for the Young of to-day. Neither sectarian nor sectional, yet scorning neutrality, is independent in all things. Its aim, the instruction, amusement, and elevation of our young people everywhere.

Please send 10 cents AT ONCE for sample number of the Visitor, and circular giving the origin and complete description of this large and elegant engraving, and full list of premiums for clubs.

A rare chance. Agents wanted everywhere. Address
DAUGHADAY & BECKER, Publishers,
15 3*] 424 Walnut street, Philadelphia, Pa.

1868.

SCIENTIFIC AMERICAN.

Established 1845.

The **SCIENTIFIC AMERICAN** is published every week, and is the largest and most widely circulated journal of its class now pulished in this country. Each number is Illustrated with **Original Engravings**, representing New Inventions in Mechanics, Agriculture, Chemistry, Manufactures, Steam and Mechanical Engineering, Photography, Science, and Art; also, Tools and Household Utensils. TWO VOLUMES with COPIOUS INDEXES, are published each year, commencing January 1st, and July 1st. **Terms:**—One Year, **$3**; Half-Year, **$1 50**; Clubs of Ten Copies for One Year, **$25**; Specimen Copies sent gratis.

Address

MUNN & CO.,
37 Park Row, New York.

☞ The Publishers of the **Scientific American**, in connection with the publication of the paper, have acted as **Solicitors of Patents for twenty-two years. Thirty Thousand** Applications for Patents have been made through their Agency. More than **One Hundred Thousand Inventors** have sought the counsel of the Proprietors of the **SCIENTIFIC AMERICAN** concerning their inventions. Consultations and advice to inventors, by mail, free. Pamphlets concerning Patent Laws of all Countries, free.

☞ A **Handsome Bound Volume**, containing **150** Mechanical Engravings, and the United States Census by Counties, with Hints and Receipts for Mechanics, mailed on receipt of **25c.**

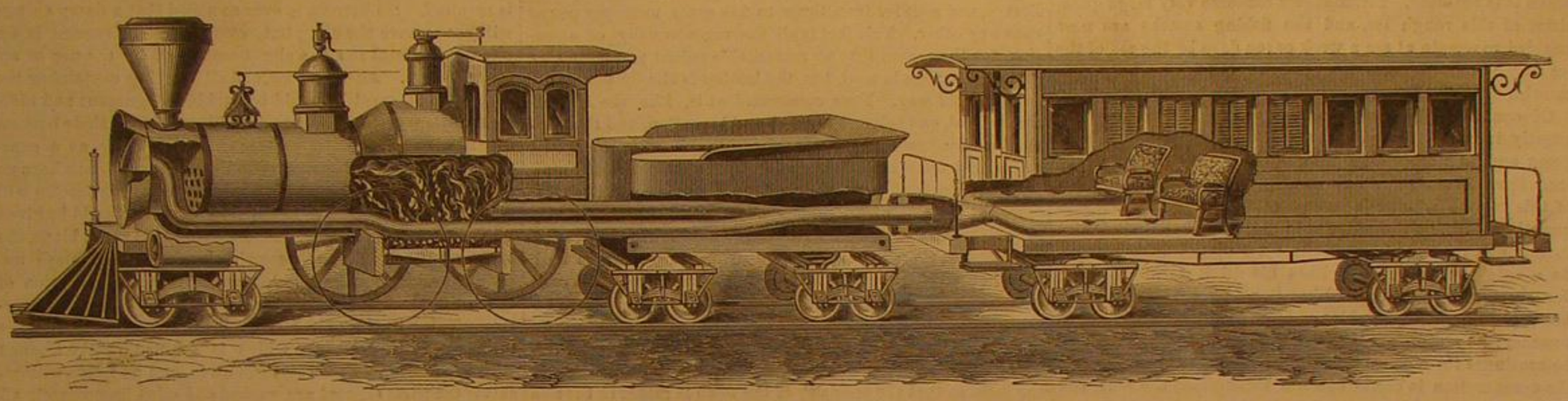
SCIENTIFIC AMERICAN

A WEEKLY JOURNAL OF PRACTICAL INFORMATION, ART, SCIENCE, MECHANICS, CHEMISTRY, AND MANUFACTURES

Vol. XIX.—No. 18. [NEW SERIES.] NEW YORK, OCTOBER 28, 1868. $3 per Annum. [IN ADVANCE.]

Novel Device for Heating and Ventilating Railroad Cars.

The object of the device seen in the accompanying engraving is to utilize the heat of the boiler and fire box of a railroad locomotive to warm a train of cars in cold weather, and to ventilate the cars with pure air free from dust or cinders in summer. The arrangement is quite simple. The front of the locomotive is provided with a funnel-shaped mouth, from which a pipe leads down under the boiler, and in close contact therewith. At the forward end of the fire box it divides into two branches; one passing along each side and through



FRANCIS' CAR HEATING AND VENTILATING APPARATUS.

the tender, at the rear of which they again unite. Each car is furnished with similar pipes passing along under the seats, and fitted with registers that may be opened and closed at will. The union between the pipes of the different cars is plainly seen in the engraving, a bell mouth containing a packing for the end of the pipe, but sufficiently yielding to allow of lateral motion in rounding curves, etc. The front end of the pipe has a hood inside the funnel mouth, to prevent rain or snow from entering.

It is evident that if the pipes were left exposed to the atmosphere, but little heat could be realized; but to overcome this difficulty the inventor, for winter service, proposes to put a heavy non-conducting jacket entirely around the boiler and fire box, or sufficient to inclose the larger portion of the heating surface and the pipes. The other exposed portions of the pipe are also similarly protected. In the summer the jacketing of the locomotive is removed, and the pipe exposed to the external air.

Patented April 28, 1868, by Dr. Samuel W. Francis, who may be addressed at P. O. Box 240, Newport, R. I. The entire right is for sale.

Improvement in Mandrels for Turning.

The mandrel, one form of which is shown in the engravings, we have lately seen in use in one of the best machine shops in Connecticut, and was struck with its simplicity, ease of operation and evident handiness. It may be threaded to receive a nut for facing up and chamfering, or left plain to receive a gear, pulley, coupling, or anything that requires turning and facing.

Fig. 1 is a perspective view of the mandrel with a nut screwed on ready for facing, and Fig. 2 is a longitudinal section. The arbor, B, is bored through from end to end, the hole, for a portion of the length, being slightly tapering, as seen plainly in the section. From the open end of the taper the mandrel is sawed lengthwise into three equal parts, the slots extending back a distance adapted to the work to be done. A plug, A, fits the hole in the mandrel, and when driven in, it slightly expands the mandrel, holding whatever is seated on it very firmly, the expansion being equable, as the taper of the plug and of the conical hole exactly coincide. A slight tap on the other end of the plug releases the bearing by allowing the parts of the mandrel to resume their former position, a small nut, C, on the end preventing the plug form falling out and getting bruised or lost.

The ordinary smooth mandrel used for turning pulleys, etc., upon, must be turned slightly tapering, while the hole it is intended to fit should be perfectly straight. The mandrel must be driven through until its surface engages sufficiently to hold the object to be turned by its friction on the interior surface of the hole. A slight enlargement of the hole will change the position of the article on the arbor or mandrel, which, especially in turning a taper, as in facing a pulley (which is highest in the middle), is a great annoyance. With this expanding arbor, however, the pulley may be placed at any point on the mandrel and held evenly and firmly.

But in squaring up nuts its advantages are still more apparent. In addition to those already mentioned, the nut may be placed, as seen in the engravings, so that the face shall project beyond the end of the arbor, and neither the arbor itself nor the point of the tool be injured, while the cut will reach to the bottom of the thread. Beside this, the face of the nut will be always at right angles, or square with the thread, a result not always practicable with the ordinary method of squaring up nuts. Patented August 4, 1868. The mandrels are made of all sizes to the standard gages by the inventor and manufacturer, A. F. Nagle, who may be addressed Box 347, Providence, R. I.

Fig. 2

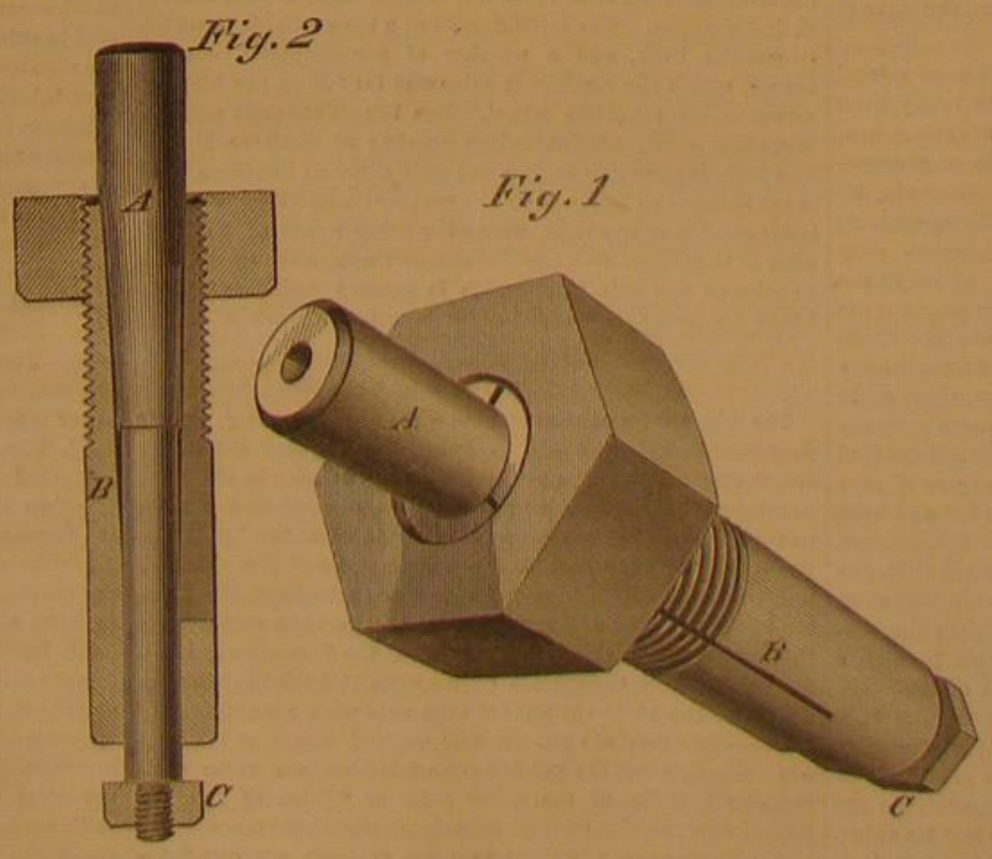


Fig. 1

NAGLE'S PATENT EXPANDING MANDREL.

THE ICE TRADE.

During the late tropical weather, ice represented a real power in the community, just as in winter coal is an absolute necessity. No doubt if a few hot summers were to succeed each other we should speedily find as bountiful supplies of ice as we now do of fuel. The polar circle would be our mines, or we should lie in wait for the magnificent procession of icebergs which, according to Captain Scoresby, issue from their breeding places in Davis's Straits, and proceed southward until they touch the warm waters of the Gulf Stream, where they are a constant source of danger to passing vessels. A story is told of an American skipper who sailed upon an expedition in search of one of these bergs, grappled it, and promised himself a splendid reward. In tugging the glittering mass into harbor, however, he forgot that its submerged portion was eight times the depth of that which rose above the water line; consequently he never could get his convoy into any port, and was obliged to abandon it.

The trade in ice is of two kinds—the rough or local ice, which the coster gathers from the ponds and the artificial pieces of water, and the foreign ice, which is used principally for table purposes. The glittering cubes of pure crystal we are accustomed to see on the fishmongers' slabs and in the windows of the Wenham Lake Ice Company are all procured from Norway. A few years since this company procured their supply from Wenham Lake, near Boston, but the expense of freight rendered it so costly that they were obliged to seek for sources nearer home. In the hills situated a few miles from Drobäk in Christiania Fjord there is a very pure lake fed entirely by springs belonging to this company, and from this source all the pure table ice is now supplied. There is a notion that water while in the act of congelation is purged from all foreign matter. This is only partially true. All its mineral salts and any coloring matter it may contain are removed from it, but no organic matter is eliminated in the process. For this reason the clearness of the ice is no test of its purity; many a glittering lump when it dissolves absolutely smells. We state this by way of caution to those who think that the eye is the most perfect test of the purity of this grateful addition to the table. The Wenham Lake Ice Company, when they had satisfied themselves that the piece of water from which they secure their supplies was free from any impurity, not only purchased the lake but the farms surrounding it, in order to keep it in their own hands and secure it from any deleterious local drainage; and it is from this crystal cup that their translucent crops are gathered year by year. The process of reaping the ice crop is the same in Norway as in America. By the aid of a sharp ice plow the surface is ruled with parallel lines 21 inches apart; when the whole surface is marked in one direction the plow is set to work at right angles. In this manner the whole surface is divided like a chess board into squares 22 inches square and about a foot in depth; the ice saw divides these parallel lines, and, by the aid of the spade, a sharp wedge like implement, the squares are split apart with the utmost rapidity. In America, where the weather is at times changeable, the greatest anxiety is felt while the process of reaping is being carried on, lest a thaw should come on and spoil the harvest. It is gathered in as fast as possible into the ice houses, which are, in fact, enormous refrigerators, built of pine wood, with double walls two feet apart, the intervening spaces being filled in with sawdust, which is one of the cheapest and most readily procurable non-conductors. In Norway, where the cold weather is not so liable to be broken up as in America, the harvest is gathered more at leisure; it is secured in the same manner, however, and the ice stores are on a very large scale, sufficient to afford a supply for two or sometimes three years. It seems absurd to talk of ice two years old; to keep the hand of Time from such a perishable article seems an absurdity, but as a fact, much of the table ice now supplied to us was reaped in the latter end of the year 1866. There is scarcely a fjord in Norway in which some trading vessel is not frozen in during the winter months, during which they ship a cargo and run over to England with the first favorable wind. The voyage with a fair wind is not more than four days, hence this island imports nearly the whole of the crop. Thus, in 1865, out of 44,823 tuns exported, this island received 43,359 tuns. The block ice is filled in with rough ice, and during its transport to the ice stores loses ten per cent. These blocks of ice are treated just like blocks of stone; the tools they are lifted with are similar. Considering the quantities that are dealt with, a certain rough handling is unavoidable. When hoisted out of the ship's side they are placed in barges, and conveyed up to the storehouses, protected from the sun only by a tarpauling, and that a black

one. It is, therefore, extraordinary that the loss by melting is not more than it is during transport The loss is at least 50 per cent before it is vended to the purchasers.

When the ice-blocks are stored sawdust is placed in layers between them, and in this manner the rough Cyclopian masonry is built up. If the blocks were placed one upon another without the interposition of any non-conducting substance the whole would become frozen into one solid mass, which would be very difficult to deal with. The blocks, weighing 1 cwt. and ¼ cwt., are forwarded to customers in the country packed in bags filled with sawdust. The amount of importation of ice from Norway depends entirely upon the weather here during the preceding winter. It must not be supposed that the main portion of the ice consumed in this country is brought from abroad. Now, as of old, during a hard frost, nine-tenths of the ice consumed in the year by the fishmongers and the confectioners is procured from local sources. The quantity consumed at table is a fleabite to that which is employed in the preservation of food, and for this purpose rough ice is cheaper and better, for the reason that it freezes the matters subjected to it quicker than the block ice. Some of the dealers in rough ice, store away enormous quantities during a hard winter. Some of the wells belonging to them hold a couple of thousand tuns As it is shoveled in by the costermonger from the parks, or the canals, so it remains until the whole is frozen into a solid mass, which has to be broken up with pickaxes when it is required. Fishmongers consume very large quantities of this rough ice, and the fishing smacks are now enabled to remain at sea a week or ten days by the aid of the ice they carry with them to pack away the fish as fast as it is caught.

Of course tropical weather such as we have had lately greatly increases the quantity consumed, both for the purposes and by way of a supplementary supply to our rough ice. For this reason all figures with reference to the imports of this commodity are fallacious as tests of the aggregate quantity consumed. Unlike the Americans, our taste for ice in our drinks depends upon the state of the thermometer. As a rule the Englishman likes his drink warm. Brother Jonathan, on the contrary, likes it cold. A piece of ice is heard tinkling in the tumbler as often in the winter as in the summer; he acquires during the tropical heat a habit which he continues throughout the arctic cold of his winters. Hence the consumption is pretty uniform throughout the year and nothing surprises him more when in Europe than the sparse manner in which this, to him, necessary of life is used.

During the present season Paris has been largely supplied with glacier ice from Switzerland. This is a great innovation, and possibly will produce a revolution in the ice trade. The desert mountain peaks, glittering in the sun on many an Alp, hitherto valuable only in a pictorial point of view, may come to be commercially valuable. When that day arrives, good-bye to the picturesque in one form at least; it will be sledged away to cool the palates of the snug citizens in the continental capitals. In the majority of cases, however, the glaciers are far too inaccessible to make the ice crops gathered from them commercially profitable.

If the ice trade between America and Europe has fallen off of late years through the greater accessibility of the supply from Norway, the former country still monopolizes the supply to the West Indies, the South American continent, and the East Indies, India, and China The crop of the winter of 1867-8, which seemed to be providentially abundant, in contemplation of the coming hot season, was one of the finest ever known—88,496 tuns were cleared for export from Boston in that year to the countries we have mentioned. The waste on the voyage in these warm latitudes renders block ice so costly in Australia that it is found more economical to produce it artificially by refrigerating machines, and such, worked by steam, capable of freezing thirty tuns per day, are now at work cooling the palates of the Australians, whose liberal habits with respect to the consumption of ice partake more of the American character than our own.

The value of ice as a preserver of life, as well as of animal food on the long voyage to our antipodes, has lately been shown in the successful transportation thither of salmon ova. After many failures, consequent upon attempts to preserve them in the same manner as in this country—namely, by placing them in a running stream of water, at the suggestion of Mr. Moscrop, of the Wenham Lake Ice Company, they were packed in moss and placed between blocks of ice in the ice well of the ship conveying them. This last experiment succeeded, and young salmon are now plentiful in the rivers and preserves of Tasmania. In return for thus exporting a valuable form of fish life to our distant children, they, as in duty bound, have attempted to make some adequate return—to send to the mother country some portion of the animal food which is a mere drug in their own market. Cargoes of beef and mutton in the carcass have been packed in ice and sent home. It arrived quite fresh, but the failure of this process, by which it was hoped to have fed one hemisphere with the redundance of another, was owing to the fact that iced meat required to be consumed immediately; the moment the protection of the ice is removed decomposition sets in with a rapidity which prevents any delay in the hands of the salesman. We may mention, by the way, however, that ice having failed in the chemical process of preservation of animal substances, known as Dr. Medldock's process, is possibly destined to accomplish the end required, and experiments are now being carried on by the Society of Arts to test its value.

Ice having been successful in preserving fish eggs, it is now being tried in the transportation of the eggs of various birds suited to the Australian colonies, and no doubt the substance that is so inimical to life when long exposed to its influence will speedily be made the agent in preserving in its embriotic stage from a too speedy development and death—in annihilating as it were the effect of the death-dealing tropical heat, which has hitherto rendered it impossible for the Englishman to surround himself with his accustomed animal life in his new found home.—*London Times.*

French Leather—How it is Made.

Pont Audemer is watered by no less than eight little rivers, all of which unite in the Risle, within the limits of the town. The little streams are carried zig-zag through the town, stopped here and there by locks and turned aside into canals and ditches, run through scores of mill wheels, carried one over the other in aqueducts, and so generally turned about every street and alley, that almost everybody in town can fish out of his chamber window. It is impossible to enter the town and go to the principal church without crossing at least two bridges. All along the edges of the little rivers may be seen groups of washerwomen, at work from morning till night, each kneeling in a little wooden box, to keep her knees dry, and turning the linen she is washing on a smooth flat stone, and beating it with a wooden paddle. There is probably not a washtub in all France

THE FRENCH TANNERIES.

But it is not for the benefit of the washerwomen that all these streams have been captured and brought to town. It is for the tanneries. French leather is the best in the world beyond question. The leather of Pont Audemer is the best in France, and sells for from three to five cents more per pound than any other. This fact is all the more worthy of attention, for the reason that no remarkable patent proceeding or chemical process is used, but the leather is simply tanned in the good old way. Your correspondent is, like the *Republican*, radical, and believes in the latest invention, and the newest step of progress, but for once he feels obliged to change his colors, and these are his reasons: Upon his feet at this moment are a pair of boots, bought ten months ago at Pont Audemer at the cost of $4. They have been worn constantly ever since, and have done hard work, and taken very long walks. Yet there is not a frayed spot, nor anything to indicate that with prudent half soling in the future, as in the past, they will not last forever. They are made of calf, tanned according to old fashioned principles. Let us, by all means, have some conservatism in leather—the more the better. The hides used here come very largely from Buenos Ayres, the more so that the specialty of the town is rather in the sole and heavy harness leathers than calf. The calf comes largely from the United States, having been already tanned there. Here it is tanned all over again, and comes out the very best boot leather in the world.

The details of a great tan yard are hardly as agreeable to see and recount as some museum of pictures or fantastic old ruins of castle or abbey; but, after all, it is not so bad in the artistic point of view. The long, low sheds where the bark is stored; the yard stream, with rich brown tan, almost red in the sun light; the vats, half filled with inky-black water; the little stream that bubbles through among the strangely-shaped buildings, where, through open doors, are seen the bare-armed workmen bending over their task, make up a picture which does not lack in charm to the eyes. To the nose it is a different affair.

TAN BARK.

To commence at the beginning of the process, we will first pay attention to the tan bark. It is of course oak; but it is not, as in America, taken from large trees, for the simple reason that the larger the tree the weaker the tan. The bark is assorted according to the size or age of the tree from which it is taken. The smallest is very strong, and used for the very heaviest sole leather, and saddle leather particularly. A coarser grade of bark serves for common cow hides, strop leather, etc., and a still coarser for sheep, calf, and the light hides that are used for making glazed leathers. The way of grinding the bark is of more importance than it would seem at first thought. The mills consist of a long trough in which to put the bark, and a number of perpendicular wooden beams, which the machinery raise and let fall on the bark by means of an eccentric wheel. The beams are shod with an iron plate which terminates in a number of teeth or blades. The bark is thus half broken and half chopped in pieces, and is not reduced so finely as in the ordinary iron mills, but the inner portion of the bark, where the greater part of the tanning is, is reduced to a powder almost impalpable, so that the solution of the salt it contains is greatly facilitated. For heavy leathers this method of grinding is of prime importance, giving advantages both in time and quality of leather

THE FRENCH SYSTEM OF TANNING.

The hides are first thrown into a vat of lime water, where they remain until the hair is loosened, then they are taken out, the hair removed, and the hides put to soak in the river to remove the lime. After this they are scraped and carried to vats, where they are covered with "juice of tar"—that is, water in which tan bark has been soaked, until the solution is as strong as possible. After three or four days, the hides are again removed and scraped, and put into the vats, where the process is achieved. Here we find the first essential difference between the system of America and the French. In America, the hides are put into the vats with a good deal of water—here they are put in and packed firmly in the vats dry Then, when the vat has been filled up over them with three or four feet of tan, a few pails of "juice of tan" is poured over, hardly enough to moisten the whole mass.

The hides remain in these vats for at least six months—sometimes two or three years, the longer the better. For first class leather a year is required; but such is the increase of value in hides, in proportion to the time they rest in the vats, that they could not find a better investment for their money. Seven to ten per cent a year is added to the value of the leather by resting in the vats up to four years, after which time there is no further motive for letting it remain, as it has absorbed all it can contain of the properties of the tan After coming out of the vats, the leather is scraped, rolled, dried, and curried; but all these are operations that have no influence on the durability of the leather, being simply matters of ornamentation and finish. The secret of

THE EXCELLENCE OF FRENCH LEATHER

is resumed in these three observances:—1st. Using strong tan, *i. e.*, the bark of young trees. 2d. Packing the leather in the vats dry, and wetting the least possible. 3d. Letting the leather stay a long time in the vats.—*Cor. Chicago Rep.*

Preservation of Leather.

A contributor to the *Shoe and Leather Reporter* gives some valuable hints in relation to the preservation of leather. The extreme heat to which most men and women expose boots and shoes during winter, deprives leather of its vitality, rendering it liable to break and crack. Patent leather, particularly, is often destroyed in this manner. When leather becomes so warm as to give off the smell of leather it is singed. Next to the singeing caused by fire heat, is the heat and dampness caused by the covering of india-rubber. India-rubber shoes destroy the life of leather. The practice of washing harness in warm water and with soap is very damaging. If a coat of oil is put on immediately after washing the damage is repaired. No harness is ever so soiled that a damp sponge will not remove the dirt; but, even when the sponge is applied, it is useful to add a slight coat of oil by the use of another sponge. All varnishes, and all blacking containing the properties of varnish should be avoided. Ignorant and indolent hostlers are apt to use such substances on their harness as will give the most immediate effect, and these, as a general thing, are most destructive to the leather. When harness loses its luster and turns brown, which almost any leather will do after long exposure to the air, the harness should be given a new coat of grain black. Before using this grain black, the grain surface should be thoroughly washed with potash water until all the grease is killed, and after the application of the grain black, oil and tallow should be applied to the surface. This will not only "fasten" the color, but make the leather flexible. Harness which is grained can be cleaned with kerosene or spirits of turpentine, and no harm will result if the parts affected are washed and oiled immediately afterward. Shoe leather is generally abused. Persons know nothing or care less about the kind of material used than they do about the polish produced. Vitriol blacking is used until every particle of the oil in the leather is destroyed. To remedy this abuse the leather should be washed once a month with warm water, and when about half dry, a coat of oil and tallow should be applied, and the boots set aside for a day or two. This will renew the elasticity and life in the leather, and when thus used upper leather will seldom crack or break. When oil is applied to belting dry it does not spread uniformly, and does not incorporate itself with the fiber as when partly damped with water. The best way to oil a belt is to take it from the pulleys and immerse it in a warm solution of tallow and oil. After allowing it to remain a few moments the belt should be immersed in water heated to one hundred degrees, and instantly removed. This will will drive the oil and tallow all in, and at the same same time properly temper the leather.

Influence of Smoke on Vegetation.

The influence of the products of oxidation of fuel on vegetation is different according to the nature of the fuel as well as to the conditions under which combustion has taken place. When the admission of the air has been freely made so as to allow perfect combustion, the products of the latter will be carbonic acid, water, nitrogen, and sulphurous acid, in case the coal was contaminated with sulphur. Of these only the sulphurous acid is of a vitiating nature. When, however, coal is subjected to a slow heat, quite a number of products are obtained, of which many are, even in small quantities very injurious to vegetable life.

Smoke is neither the product of very slow nor very quick combustion, it is therefore clear that it will not always act in the same manner. The smoke which ascends from the chimneys of our dwellings is the product of a nearly perfect combustion, this, however, is not the case when coal is burned in factories, for instance under steam boilers. The reasons for this assertion find their explanation in the following:

1st. Fresh coals are in short intervals added to the burning ones The formation of resinous and tarry matters, which on the hearths of our dwellings occurs but occasionally, therefore never ceases.

2d. The draft in the chimneys of our houses is little as compared with that of the high chimneys of factories and machine shops. The imperfect products of combustion of the former will therefore be condensed in the chimneys and partly be deposited, while those of the latter, will escape in the atmosphere and while condensed descend in the neighborhood of the chimney.

3d. Smoke always contains more or less solid carbon in minute division. The same will, while floating in the atmosphere, absorb part of the resinous and tarry matters by which it is surrounded. The thus impregnated carbon will, in descending upon the vegetation and in being deposited on the latter, not only form a hindrance to the absorption of the sun's rays, but, by its acid properties, doubly act as a destroyer.

Prof. Crace Calvert, is of the opinion that these facts explain why the vegetation in the vicinity of London is in a much more vigorous condition than in that of Sheffield, Leeds, Birmingham, and Manchester.

Owing to the inferior coal which they use in these centers of manufactures it is not to be denied. that their air must be more contaminated with sulphurous acid, than it is the case on the banks of the Thames. This acid gas, however, will as all gases. be diffused very quickly in the atmosphere, particularly while at a high degree of temperature; its influence can therefore by no means be injurious in comparison to that produced by the deposition of soot.

Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents.

For the Scientific American.

NEW APPLICATION OF THE SPECTROSCOPE TO DETERMINE THE MOTION OF THE STARS.

In order to explain this recent and most ingenious application of one of the most important pieces of modern apparatus, we must first understand what is the cause of the dark lines exhibited in the solar spectrum by the spectroscope, or rather, what they in general indicate

We follow in this explanation, of course, the undulatory theory,it being the only one which gives a rational explanation of all the phenomena. We will therefore not speak of the Newtonian doctrine of emission, which ought to have been abandoned long ago, and not be mentioned any more, as it is utterly untenable in the present state of our knowledge of the properties of light—a knowledge far in advance of any other branch of physical science.

Light is propagated like sound, by vibrations of some transmitting medium, but its vibrations are millions of times more rapid; so in sound the lowest perceptible tone is produced by about 16 vibrations per second, the highest by 9,000 or 10,000—a range of about 8 or 9 octaves. The lowest visible luminous vibration is produced by 450 billions vibrati ns in a second, the highest by 850 billions. (We call the square or second degree of a million a billion, the cube or third degree ot a million a trillion, etc.) The lower vibrations produce the impression of red, the highest of violet, and the intermediate vibrations the different intermediate colors of the rainbow or spectrum, which in fact (as was already remaked by Newton) may be compared with the musical scale, of one octave, 450 to 500 billions vibrations per second produce red; 500 to 550 billions, orange; 550 to 600 billions, yellow; 600 to 650 billions, green; 650 to 700 billions, blue; 750 to 800 billions, indigo; and 800 to 850 billions, violet. We use here only the round numbers, as approximately near enough for our purpose. The numbers given represent the velocity of the vibrations where one color is shaded off into the next; the pure red, yellow, blue, etc., of course correspond with the intermediate velocity of vibrations.

Vibrations of a lower velocity than 450 billions per second manifest themselves simply as heat, without light; those of a greater velocity than 850 billions, as a chemical power; and consistent with this is the fact that the red and orange rays produced by the lower vibrations have also, with the dark space beyond the spectrum,a heating power, and the blue and violet rays, produced by the vibrations of higher velocity, possess, with the dark space beyond, no heating, but chemical power (the photographic rays).

In the solar spectrum as exhibited by the spectroscope, the velocity of the vibrations increases regularly from the red end of the spectrum to the violet; and if all possible intermediate velocities did exist,the spectrum would be continuous; but the fact that it is not continuous, and possesses a multitude of dark spaces, proves that certain definite velocities are wanting; so, for instance, at the place corresponding with a velocity of 560 billions, there is a dark line in the solar spectrum, indicating that vibrations of this definite velocity are wanting, we may have those of 550 and 570 or thereabout, but between these limits the dark space proves the nonexistence of rays of that definite velocity.

Now, in sound, the apparent velocity of the vibrations is increased or diminished, in proportion as we approach or leave the sounding body, with a velocity rapid enough to be compared with that of sound itself. The result is a change of pitch; and the whistle of an approaching locomotive will appear sharper, and of a retreating one flatter, than its real pitch—a fact well established by theory and experience.

This peculiarity rests on the same principle as that the waves, encountered by a steamer, appear larger when both are going in the same direction; and shorter, when the steamer moves against the direction in which the waves are transmitted. (See page 117.)

When now we move towards a luminous body, with a velocity great enough in relation to that of light to make the waves appear to be sensibly shorter, we must perceive a change in the tint of color, as in sound we perceive a rise of pitch. This change will be toward the more rapidly vibrating or violet end of the spectrum—that is, from red to orange, from orange to yellow, from green to blue, etc. When we recede from the luminous body, of course the reverse will take place. Now this slight change of color, even if possible to observe its existence distinctly, is not adapted to be measured like the pitch of a tone. This is impossible, from the nature of color; but the definitely located dark lines in the spectrum, as exhibited by the spectroscope, may be correctly measured as regards their exact locality; and all that is necessary is to compare the spectrum of a luminous body, which remains at the same distance, with the lines of the spectrum of a body to which we are approaching, or from which we are receding.

The last class of observations have quite recently been made by Mr. Huggins, of the Royal Society of London. Among others, he has compared the spectrum of the star Sirius with that of a flame producing some of the same lines, and found that (notwithstanding the enormous velocity of light, as well in its transmission through the universe, as in the velocity of its waves) not only was the incomparably slower motion of this star rapid enough to exert an appreciable change in the position of the dark lines, but he succeeded in measuring its amount. He found, for instance, that a certain dark line, corresponding with a bright line in a flame of hydrogen, was shifted toward the red end of the spectrum, which indicated that we are receding from that star; and from the amount of displacement, it was calculated that the motion was not less than 144,000 miles per hour. This was reduced to 90,000 miles, by taking into account the direct velocity of the earth, in its annual orbit round the sun, at the time of the observation.

When we consider that the only means thus far possessed of estimating the motions of the stars in relation to us, or of the earth in relation to the stars, was the apparent displacement of the stars among themselves, and that this apparent displacement is found to be very irregular, by reason of different motions and consequent changes in relative positions of the stars among themselves, we must conclude that this new method of measuring stellar motion is a very promising one; and when extended to most other stars, will open an entirely new, unexpected, and unexplored field of research in astronomical science.

P. H. VAN DER WEYDE, M.D.

Water-Seeking---The Divining Rod.

MESSRS. EDITORS:—At times we meet with reference, especially in fictitious writings, to those who can find, with a hazel twig, the places of water courses beneath the ground. Many will unhesitatingly declare that this cannot be done, and that it is merely a whim of the credulous. Hence, it may well become those who are interested in scientific truth, to consider whether there is any reliance to be placed in the claimed power of successful water-seeking.

An elderly gentleman, of most reliable character, states that when he was a youth, and lived at his home, some miles north of Philadelphia, water was obtained for domestic purposes from a natural spring situated a little below the house. A neighbor, who lived upon higher ground, and made use of the same spring, at considerable inconvenience, had made repeated and unsuccessful attempts to secure a well.

At length, hearing of a man in another place, more than twenty miles distant, who could decide, by the use of a branched stick, upon good localities for wells, he sent for him. On arriving, the man passed about the grounds with a suitable stick in his hands, and pointed out a favorable spot at some distance from the house where the surface of the earth was nearly twenty feet higher than places one would ordinarily select.

He also, though an entire stranger in the region, followed the curving line of the hidden stream across a road, and through fields, to the spring mentioned above. A well was dug on the line proposed, with entire success; and, subsequently, a second one. Each was a little over twenty feet in depth, though the latter was at a point some sixty feet lower on the surface.

A gentleman at Andover, Mass., a few years since, purchased a fine residence, that was poorly supplied with water. Repeated attempts had been made to sink a well, but in consequence of rock, or firm clay, no water was reached. The owner secured the services of a member of the Theological Seminary in the place, who was said to have the water seeking ability. He took in his hand the stock of a whip, and held it by the portion toward the small end, so that the heavy part would be erect. On his passing across a certain portion of the grounds, the end that had been upward would bend down sufficiently to make less than a right angle with the portion in and below the hand, and would swing round as he went forward. After successive observations he pointed out a line, beneath which he claimed there was a stream of water in the earth; but at what depth he did not attempt to decide.

If any other of those present held the rod, it did not move: but if he placed his hand on that person's shoulder, it would give the same indications as in his own. If he placed a silk handkerchief between his hand and the rod it failed.

A well was dug in accordance with his suggestions, which, passing down along the vertical face of a buried ledge, at the depth of seventeen feet, afforded a fine supply of water. He selected places for a number of wells in the town, and always with success.

His explanation of the phenomenon was, that the flowing stream was charged with resinous electricity, and, that when a stick, fitted for the purpose, was carried in the hand of a person vitreously charged, and brought over that water, it would be attracted.

That there are streams in the earth we have many reasons for believing. Some years since there were two manufacturing establishments in England, a considerable distance apart, which made use of large quantities of water. It was found that when the pumps of one were used actively, the wells of the other were drained, and it became necessrry for them to secure their water on alternate days. This proves a communication between those wells.

In the boring of artesian wells, also, proof of the existence of subterranean streams has been afforded. Hitchcock says, that "at St. Ouen, in France, at the depth of one hundred and fifty feet, the borer suddenly fell a foot, and a stream of water rushed up." A paper has stated, that, in Chicago, twelve hundred feet below the surface, a vein eight feet in depth was reached, with a current so strong that a long lead, upon a fine wire, lowered into it, was snatched from its position very much as an insect upon a hook is taken by a fish.

It is not difficult to conceive of these streams being in an excited electric condition; and this view is favored by the assertion of some philosophers, that lightning more frequently strikes upon their course.

And, again, we know that persons are not unfrequently in a highly electric state, as manifested when one, especially if partially insulated by wearing rubbers, has taken a vigorous walk on a clear and windy evening, in a dry atmosphere; for then, upon folding together the edges of an outer garment, on removing it a line of sparks, attended with sound, often appears along the meeting edges. It is also shown, by some persons being able, after moving the feet along a carpet, to light gas with the finger.

Arago refers to the surprising pleasure which it afforded him to see, not only a few metals, but wood, and various other substances, affected by the poles of a magnet, being either attracted or repelled. Remembering that magnetism and electricity have many common features, and are even considered by some of our best natural philosophers as different manifestations of the same agency, is it absurd to conceive it possible that a rod, in the hands of a person in a certain electrical condition, may be attracted by a hidden stream of water in an opposite state?

We should not be deterred from thoughtfully considering the subject, simply because some may be incredulous. An aged philosopher was regarded deranged, by casual observers, when he was experimenting with films of viscid water upon the properties of light, though his researches were to result in brilliant conclusions for science. And, always, efforts employed in searching out the more subtile and recondite laws of matter have a rare value, and hence are not to be regarded as trivial.

Massillon, O. J. K.

Returning Condensed Steam to the Boiler.

MESSRS. EDITORS:—As a constant reader of your paper, I take the liberty to ask you the following questions: I have a tubular boiler in the basement of my mill, and wish to heat three floors above with steam; the top of the boiler, which is horizontal, is three feet below the lowest floor, which I wish to heat. Can I not, with perfect safety, take steam from the top of my boiler, and allow it to return (or the water that condenses from it) by the pipe that feeds the boiler, provided I put in suitable cocks to shut off either the pump or the return condensed water, as it becomes necessary to use the pump, and would it not be perfectly safe to shut off the condensed water at such times as I should find it necessary to pump? I am told by parties who make piping mills their business, that my plan is not safe, and I must return my condensed water to a tank, and then pump it in. I cannot understand why this should be so, and would like your opinion on the subject in the SCIENTIFIC AMERICAN, together with such information as you may be willing to give.

Suppose I allow all my pipes to slant one thirty-second part of an inch to the foot, toward the upright supply pipe, and have that one and a half inch diameter, will not all condensed water run back to the boiler, and will not everything be safe, say at eighty pounds steam, or less?

Stoughton, Mass. C. S.

[Your proposed plan is one very generally in use. You would, however, not be able to return the drip or condensed steam from the first floor, three feet, as the weight of the column would not be sufficient. Your method of slanting your pipes toward the upright supply pipe, and having that of good diameter, is correct. There is nothing dangerous nor difficult in the arrangement, if properly put up and properly attended to.—EDS.

How to Catch Rats.

MESSRS. EDITORS:—In reading your excellent paper, I have frequently noticed devices for the extermination of rats, mice, and other vermin. Different contrivances have, from time to time, been presented to the public, and each claiming to possess some superiority which others have not attained. I do not doubt concerning their efficiency; but as a general thing, the cost of patent machines places them beyond our poorer population, while many of the wealthy are incredulous, and prefer to employ the old style of trap. Now if a drop of oil of rhodium be poured upon some bait, in a common or wire spring trap, and the said trap be set in an infested locality, only a short time will elapse ere the cage will be found occupied by vermin. Rats and mice possess a great liking for the oil, and, when scented, will risk anything to obtain it. I have cleared my cellar of the pests by the above method, and others have tried it with similar success. The oil of rhodium costs about one cent per drop, but a drop will last several days.

New York. J. C.

[Rhodium oil is an extract of a Chinese rose-tree—*Convolvulus Scoparius*—and the perfume is similar to that of roses. This oil, as well as that of anise and asafœtida, is often used to attract fish, insects, and other animals.—EDS.

The Shifting of the Center of Gravity of a Revolving Wheel Tested by an Astronomical Fact.

MESSRS EDITORS:—Our earth is, in relation to the sun, a wheel, or rather ball, of which the plane of rotation is vertical; its axis being in March and September horizontal, and inclining gradually, until in July and December it reaches an inclination of 23°, of course all considered in relation to the great luminary, of which the attraction of gravitation surpasses that of the earth more than three hundred thousand times.

If now the theory that the center of gravity shifts toward the descending portion of a wheel or ball be true, the center of gravity of our earth must continually be shifted toward that side which, in its daily rotation, is moving or falling toward the sun, that is, toward that meridian where it is 6 A. M.; and this shifting of the center of gravity would necessarily be perceptible in the tides. A high tide wave would

take place at the equator at 6 A. M., or a few hours after, of course modified by the tide wave due to the moon's attraction.

What is the case, however? The solar tide wave takes place under the equator two or three hours after midday, proving that it is due solely to the solar attraction, which shifts the center of gravity of our earth directly toward the sun, as the lunar attraction shifts it constantly toward the moon; and the combination of these two attractions, in the different relative positions of the sun and moon, produce the difference in hight of the tides, spring tides, etc. Observations continued for centuries over almost the whole earth in the interest of navigation, have settled the subject of these tides in such a rigorous manner, that we know positively the non-existence of a tide wave, due to the shifting of the earth's center of gravity, toward that half which in its daily rotation is falling toward the sun.

In the same manner as the attraction of the sun brings the center of gravitation of our earth toward that luminary, so the attraction of our earth tends to bring, in all terrestrial bodies, rotating or at rest, the centers of their own gravitation or mutual attraction nearer to the earth; only this mutual attraction of terrestrial bodies is so infinitely small, when compared with the earth's attraction, that it cannot be perceived except with very delicate contrivances, like the torsion balance of Coulomb, who already, seventy years ago, demonstrated this mutual attraction of all bodies on the surface of our earth.

It appears to me that the chief cause of error in those who defend the notion that the center of gravity of a vertical revolving wheel shifts toward the descending portion, or toward the ascending portion (there are some persons who also defend the last idea) is, that they overlook the fact that gravitation acts on all the particles of bodies either in rest or in motion, ascending or descending, with the most perfectly equal force, and that a body is not lighter when ascending nor heavier when descending, or that the attraction of gravitation will not diminish as soon as the body obeys this attraction by falling, nor that the attraction will increase when the body moves against gravitation. The adherents to the last notion maintain, of course, that the center of gravity of the wheel shifts toward the ascending portion. Every one of these notions is erroneous, and beside they would not explain the gyroscope, even if true.

Another cause of error is that the centrifugal force is confounded with the tangential force. They are not the same. The first is the amount of pull to the string when whirling a stone around, and is simply due to the tendency of all bodies to move in a straight line; the last, the tangential motion, is obtained when occasion is given to the body to move in that straight line, and the velocity of this tangential motion will be exactly equal to the motion of the body in the curve in which it moved previously, only continued in a straight line.

I close in expressing my surprise that Mr. McCarroll, the reputed discoverer of the notion, on page 243, in place of admitting that I was right in my statement (page 195) that this thing was not new, and more than ten years ago, mooted in connection with the gyroscope, "informs" me about these facts. He desires that my observations might be more intelligible. I believe that unprejudiced persons by careful reading will easily understand my short description of the apparatus which disproves totally his theory. With mere words, without figures, it could not be made more clear; and I trust that very few readers of the SCIENTIFIC AMERICAN, will need to be further enlightened on this subject. If so, I am willing to give figure and description.

P. H. VANDER WEYDE, M. D.

An Aerolite.

The Anglo-Brazilian *Times* of the 7th August contains a communication from Dr. Franklin Massena, giving an account of an aerolite which he observed at the Observatory of Itataya upon the 30th July, near daybreak. He says:

"Suddenly, toward the east, at almost 30° of the meridian, I saw an immense and beautiful aerolite crossing to the southwest. I called Messrs. Arsenio and Veija, and together we watched the disappearance of the luminous body, and its form and motion. Its form was that of a globe, having an apparent diameter of about 43', and a tail of 9°, in an elliptical curve extending into space with an inclination of about 30°. The tail was an oval form and very divergent toward the part away from the nucleus. The motion was made by the nucleus, the tail following its track. Both the tail and the nucleus were as brilliant as electrical light, and emitted some luminous drop or tear-like particles, which threw out silvery sparkles with incredible rapidity. Six minutes after its meridian passage the body exploded toward the southwest. Such was the rapidity with which it moved that in 17 seconds it traversed a celestial area of 77° 41', losing itself behind a hill at 5 hrs. 55' 50", or 17 hrs. 55' 50" of true solar time.

"This aerolite so disturbed the magnetic instruments that the declinometer turned its pole from the north toward the west and stuck itself in the box where it found resistance; the horizontal magnometer turned toward the west eight divisions of the scale; the vertical magnometer fell in its center of gravity, and finally, the compass oscillated 15° from north to west. I showed Sr. Arsenio the disturbed state of the declinometer. It is, therefore, demonstrated for physics that an aerolite has an intense action upon the north pole of magnets, powerfully attracting them.

"The following are some mathematical elements of the orbit of this body: Meridian passage, 5h. 55' 33", on July 30, 1868; declination, 65° south; vertical distance, 42° 32'; setting, 50° 15' W. by S.

"With these data the orbit of the aerolite is found to have 17° 40' of inclination upon the line of the earth's rotation, with its movement contrary to that of the earth.

"At 6 o'clock, at the moment of detonation, the state of the atmosphere, to be taken into account for the calculation of tance, was, Bar. 584·3; Ther. C. 8° 3; Hyg. of relative humidity 76·5. Sky clear and cold; wind N. W., weak. The motion of the aerolite was followed by a noise like that of silk dragged over the ground. The aerolite must has passed between Itajuba and Guarantingueta, and it remains now to find out where it fell in order to ascertain its size."

JOHNSON & FROGGOTT'S PATENT HORSE SHOE.

The principal wear on horses' shoes is on the calks, particularly on hard roads or paved streets. It is evident if these calks could be readily removed when worn, and replaced by others, the cost of shoeing would be materially reduced and many inconveniences avoided. Screws for attaching calks to shoes have been used, but the liability to loosen, turn, and eventually to come off, seems to be objectionable.

The device, herewith illustrated, is intended to provide a means of preventing these difficulties. The shoe is in the usual form, but without protuberances. The toe calk, A,—a separate piece—and the heel calks, B, also separate, are attached to the shoe by a screw secured in their upper surface,

Fig. 1

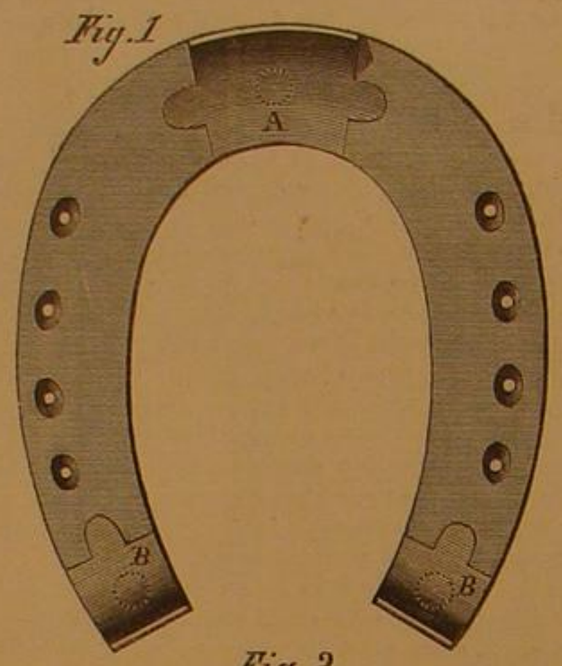
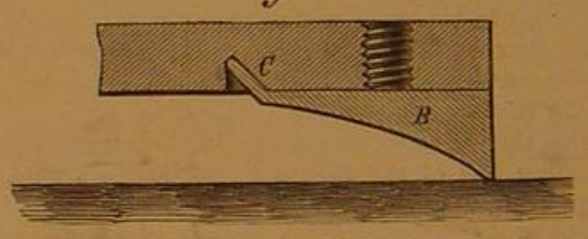


Fig. 2



which fits a correspondingly threaded hole in the shoe, shown in Fig. 2. The toe calk is provided with two projecting pointed arms and the heel calks with one each, which after the calks are screwed in place, are bent down and seated in depressions in the under side of the shoe. See C, Fig. 2. These arms prevent the calks from casually unscrewing or turning, and tend to assist in their support, and the calks may be easily detached and replaced by others.

Patented through the Scientific American Patent Agency, Sept. 29, 1868. Address, for further information, P. C. Johnson, Central City, Colorado.

The Semaphore Steering Apparatus.

A Liverpool paper gives an account of a new steering apparatus, recently invented by an officer in the English Coast Guard Service:

"The difficulty hitherto experienced of knowing and indicating exactly, when vessels meet each other on the high seas or in narrower waters, the course which each vessel intends to take, Mr. Read's invention is intended to obviate. Mr. Read's plan is to connect by a self-acting apparatus the helm of the ship with the starboard and port lights during the night, and with a flag or ball signal during the day, so that any movement which is given to the helm is at once correspondingly indicated to any approaching vessel. A rope or chain is rove through a block, or cheek, at the masthead, from thence to a block hooked on the ship's side and laid along the rail or water-ways through a tube to a block abreast of the wheel or tiller, the turns are passed under and over the barrel of the wheel and to the end of the tiller if the rope or chain is placed on the barrel of the wheel. The port and starboard lights are then placed in connection with this apparatus, and the result is that the turn of the wheel to the right tightens the line attached to the starboard light, raises it from the box in which it has been concealed, and places it fully in the veiw of any vessel approaching. A similar movement of the wheel to the left raises the port light, and starboard light descends and disappears from sight. The lights are placed in metal tubes open at the front, so as to show the light clearly to approaching veesels, and with holes at the back, so that not only may the steersman see that the light is working properly, but vessels approaching from behind may know the exact course which is being taken by the vessel in front of them. If the helm is put the wrong way, as is often the case, the officer in charge of the ship will be able to check the helmsman in an instant, or a ship approaching will detect the mistake and act accordingly. The apparatus is so simple that any cabin boy can rig and repair it when it is out of order. By the use of the apparatus all speculation as to which side a vessel will pass another is at an end, and should a collision take place between ships with the apparatus on board, the party upon whom the blame rests is at once indicated. The lamp signals are of course for use by night; for day signals, the same apparatus puts in motion a yardarm at the masthead, with green or red flags or balls which are seen to port or starboard in accordance with the motion of the helm. The invention has its useful application also in naval tactics; for when the hulls of ships are enveloped in smoke, the rudder can be indicated by the signals made at the fore, main, or mizzen royal truck; and thus, tacking in succession, ships would be able to follow each other accurately either by day or night. Captain Mends, R. N., and other officers, upon whose judgment and experience reliance can be placed, have warmly encouraged Mr. Read's plans; Captain Mends being of opinion that, whether the invention is adopted by the Board of Trade for the high seas or not, it will assuredly be of service in narrow waters."

The Liverpool correspondent of the *New York Mercantile Journal*, gives the history of the invention as follows:

Some time ago Mr. George Read, a chief officer in the Coast Guard Service, stationed in the South of England, dreamt that he could distinguish at a great distance the course a vessel was steering by seeing the movements of her rudder. At first he thought nothing of his dream, and discarded it as a meaningless phantasy. A few nights after, however, he dreamt the same thing, and the peculiarity of the occurrence caused him to ponder over the subject of his sleeping thoughts, and to consider whether the course of a vessel could not be indicated by some means different to what had been in use. Reflection led to the conclusion that there was "something in it," and the result of this wonderful dream, worked out by the skill of the dreamer, was the invention referred to in this letter, which Mr. Read has perfected and brought into practical use, viz: the "Semaphore steering apparatus."

A New Way of Estimating the Motion of the Stars.

A remarkable paper has laterly been sent to the Royal Society in England by Mr. Huggins, one of the Fellows. It announces the application of a new and most promising method of inquiry to the determination of the stars' motions. Mr. Huggins tested this method by the motions of the star Sirius. The spectrum of this star is crossed by a multitude of dark lines, and among others by one known to correspond to a bright line seen in the spectrum of burning hydrogen. The two spectra were brought side by side, and due care having been taken to magnify as much as possible any discrepancy which might exist, it was fonnd that the dark line in the spectrum of Sirius was not exactly opposite the bright line in the spectrum of hydrogen, but was slightly shifted towards the red end of the spectrum. It followed from the amount of the displacement that at the observation Sirius was receding from the earth at the rate of about forty miles per second. When due account is taken of the earth's orbital motion at the time of observation, it results that Sirius is receding from the sun at the rate of about twenty-eight miles per second, or upwards of nine hundred millions of miles per annum.

The new method of examining the stellar motions (says an English paper) is a most promising one. It will doubtless soon be extended to other stars. In fact, nothing but time and patience are required to enable astronomers to extend this method to all the visible stars, and even to many telescopic ones. For the latter purpose, however, an instrument of enormous light-gathering power will be required, and Mr. Browning, F. R. A. S., the optician, is engaged in constructing a spectroscope to be used with the great six-feet mirror of the Parsontown reflector.

Rapid Telegraphic Communication.

The *Telegrapher* says: "It may be mentioned, by way of showing the important aid rendered to modern commerce by the wonderful operation of the magnetic telegraph, that a mercantile house in this city on Tuesday received a dispatch dated Calcutta, September 21, which had been less than twenty-four hours on its way, and which conveyed the fact that their ship was ready on that date to sail for Boston. We believe this is the quickest time yet employed in communicating between these two commercial cities—so wide apart and yet so near together."

We noticed in the *Tribune* of October 2d, the following announcement:

"An attempt was made, yesterday, to assassinate the Viceroy of Egypt while he was attending a celebration in Cairo."

So much has been said and written upon the wonders of telegraphic communication, that the subject has become a trite one; yet we confess our wonder at the developments of the art of telegraphy grows rather than diminishes. Think of it. Less than one day from Egypt! Only one day from Calcutta, and the end is not yet. No further apart than Albany and New York were twenty-five years ago. Newspapers have a good time. If no catastrophe occurs in America, somebody is sure to be struck by lightning in China or somewhere, it don't matter where; it all seems to belong to us, and we are beginning to feel an intense interest in the little family matters of our next door neighbors in Japan. No dearth of news now. Our eight page dailies come literally gorged with items from everywhere, borne silently and swift as light by the wonderful electric current. Old superstitions, effete systems, heathen darkness, get up and move; your date is out.

IT stated that a cement impermeable by air and steam, which is said to be superior to any in use for steam and for gas pipes, can be made as follows: Six parts of finely powdered graphite, three parts of slaked lime, and eight parts of sulphate, are mixed with seven parts of boiled oil. The mass must be well kneaded until the mixture is perfect.

Improved Direct-Acting Steam Hammer.

Simplicity being, next to efficiency, the most important point to be aimed at in the design of steam hammers, the form illustrated in the annexed engravings should commend itself to all who have occasion to use this class of tools. There being, with the exception of the regulating valve, but one moving part in this hammer, there seems to be nothing left to be attained on the score of simplicity. Fig. 1 is a perspective view of the hammer, and Figs. 2 and 3 vertical sections showing two positions of the hammer.

The ram being down, as in Fig. 2, steam is admitted to the annular channel, A, and from thence in the direction of the arrow, through the vertical passage, B, to the under side of the piston, C, the passage, D, communicating through the piston with the portion of the cylinder above the piston, being open to the exhaust as seen, whatever steam there may be above the piston escaping in the direction shown by the arrows through the passage, E, to the exhaust. The steam admitted at A, and passing up the passage, B, lifts the piston until the passage, D, connecting above the piston, opens to the steam inlet admitting steam over the piston. Notwithstanding this, the momentum of the ram continues the upward stroke until the passage, B, opens to the upper exhaust, when the parts are in the position seen in Fig. 3, to which we will now direct our attention, similar letters denoting the same parts.

The pressure of steam above the piston combines with the weight of the ram to carry it down with great force, until the passage, B, is uncovered to the steam inlet, A, and the passage, D, is open to the lower exhaust port, when the motion is reversed, the piston cushioning on the steam admitted through B.

The admission of steam and consequent speed of the hammer is regulated and governed by the foot of the forger, as plainly shown in Fig. 1. A hand gate also may be placed on the steam pipe if desired. Thus a slow and light blow, or a rapid and heavy one can be obtained at pleasure. For work requiring rapid and uniform blows, such as drawing small steel, making cutlery or edge tools, planishing saws, etc., this is a very efficient hammer. We witnessed its operation at the works of the American Tool Steel Company, corner Kent avenue and Keap street, Brooklyn, E. D., N. Y., with great satisfaction. This hammer is the invention of David Joy, of England, and has been patented in this country by Merrick & Sons, 430 Washington avenue, Philadelphia, Pa. For terms and prices address as above, or Geo. Birkbeck, Jr., the agent, at their office, 62 Broadway, New York city.

Fig. 1

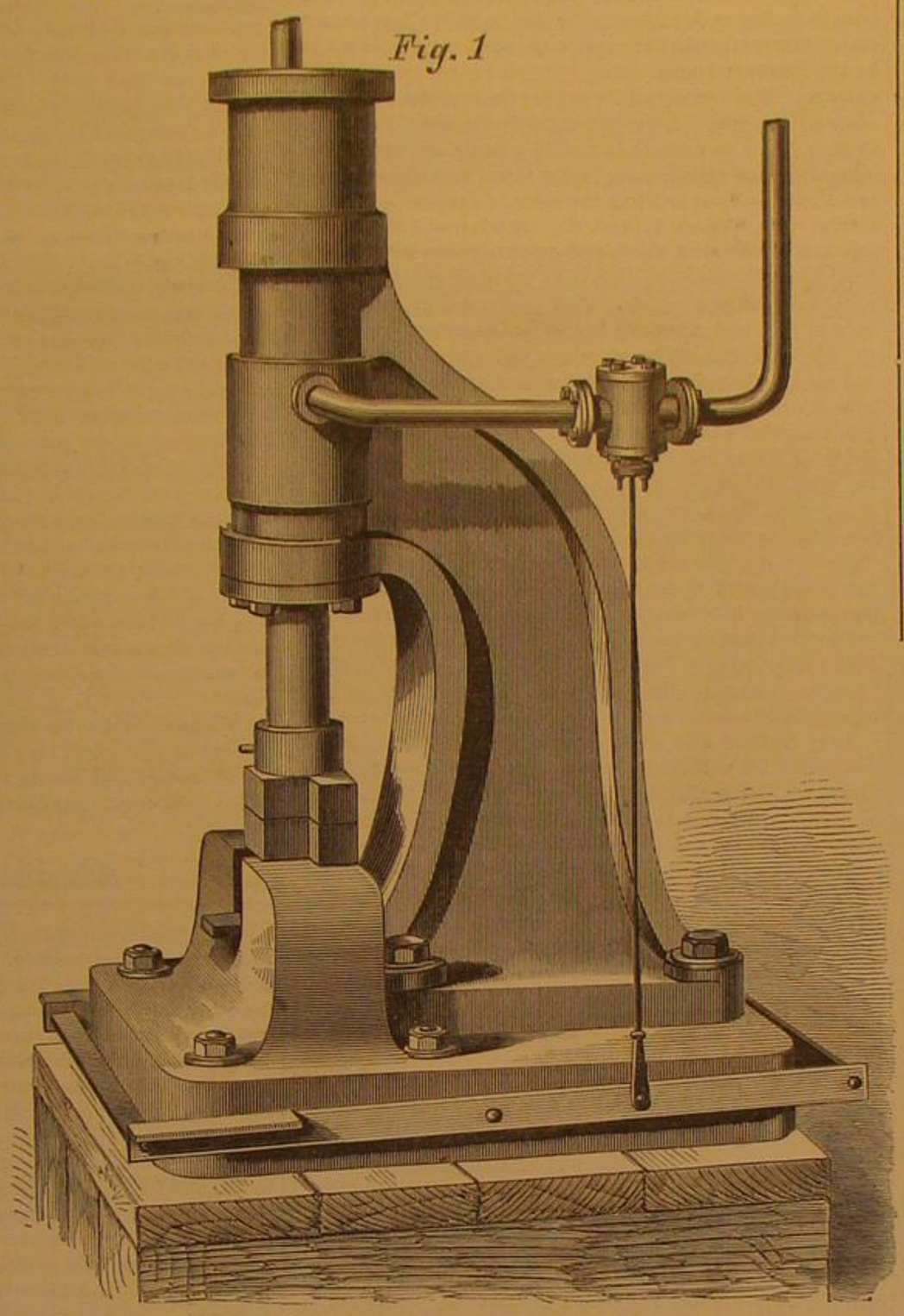


Fig. 3.

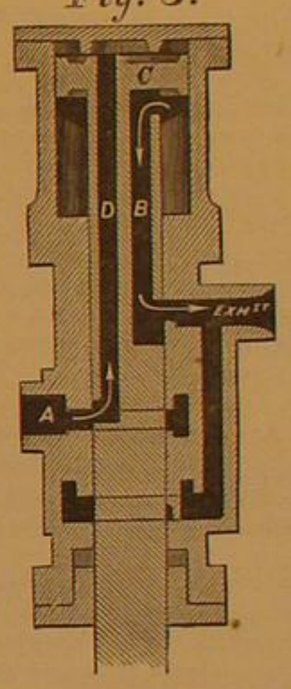
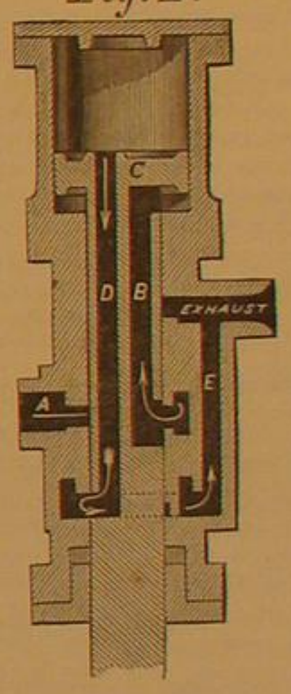


Fig. 2.



THE JOY PATENT STEAM HAMMER.

CAN WATER BE SOLIDIFIED BY PRESSURE?

In No. 19 of the current volume of the SCIENTIFIC AMERICAN, a correspondent asks the question, "Is there any depth in the ocean to which an iron weight or bar would not sink?" We answered no. An exchange has taken up this subject. It says "it is the popular theory, that lead, at great depths, remains suspended in the water and refuses to sink further. The theory stated is not correct. The fact may be as alleged, namely, that the lead refuses to sink, on reaching a certain depth below the surface of the ocean; but this is not because it is equally balanced by the water, nor is it in a state of equilibrium. We presume it will not be denied that a solid will float on the surface of a liquid, as iron on quicksilver, only when the the specific gravity of the latter exceeds that of the former; also, that a solid remains suspended, or equally balanced, in a liquid, only when the specific gravity of the latter is exactly equal to that of the former. Now a cubic inch of lead weighs more than eleven times as much as a cubic inch of water; hence, in order that the lead may become suspended in the water, the latter must be so compressed that eleven and forty-five hundredths cubic inches shall occupy the space usually occupied by one cubic inch. Such a degree of compression can scarcely be conceived of as possible. A pressure of some hundreds of tuns to the square inch is required to reduce the volumn of a column of water five per cent, or one-twentieth of its bulk; while the pressure on a square inch at a depth of nine miles (the estimated depth of the ocean, in its deepest part), would be less than eleven tuns. But we are told that the lead does refuse to sink at a depth of about three miles, where the pressure does not exceed three-and-a-half tuns to the square inch; and, consequently, the specific gravity of the water can not be sensibly greater than at the surface.

"We come now to the perplexing question: 'Why, then, does the lead refuse to sink at great depths?'

"Of course, we take for granted, that the fact stated by seamen, who alone have had opportunity to state the same, is real—that the lead does actually refuse to sink, when it has reached a certain depth, though it has not yet reached the bottom. We have just seen that this fact can not be accounted for, by supposing that the water, at that depth, has become, specifically, as heavy as lead; for this supposition is contrary to what we know of the effect of pressure on water. Nor do we know of any well-established principle, by which this result can be accounted for.

"It can do no harm to offer a conjecture, which may help in solving this difficult question, even if it be not the correct answer.

"We conjecture, then, that pressure has somewhat the same effect on water that it is known to have on some of the gases; namely, that it reduces it to a solid form. We know that a reduction of temperature has this effect; and that water, in the solid form of ice, is not even so heavy, specifically, as in the liquid form. Now, pressure may, possibly, reduce it to the form of a solid, without any perceptible increase of specific gravity, and three or four tuns to the square inch may be the amount of pressure required to accomplish this result. It is also possible, that the solidifying process may be more or less gradual, which would prevent any sudden jarring of the lead on reaching the solid stratum of water."

We should have been loth to concede that the belief in the theory, that a weight of greater specific gravity than water would fail to sink to any depth which can be found in the ocean, prevailed to any great extent but for this singular hypothesis. It is fair to suppose that the public is not wiser than its teachers, and we therefore suppose this belief is one of those popular errors which still remain uncorrected. With a view of correcting it we shall first analyze the theory itself, and show that it is neither sustained by fact or reason; second, show the absurdity of the hypothesis framed to account for it; and third, as a matter of general interest, make some remarks upon the difficulties in deep sea sounding which undoubtedly gave rise to the error.

The theory is not based upon fact. Lieutenant Berryman, of the steamer Arctic, in 1857, in sounding the depths of the Gulf Stream, reached bottom at 4,480 fathoms, more than five miles, and in one case 6,600 fathoms, a depth of seven and one-half miles, were reached without touching the bottom. Some deductions are to be allowed for possible errors in perpendicularity, but they must be small in proportion to the general result.

Admitting that these facts do not prove that at still greater depths a point might not be reached where a body heavier than its own bulk of water would cease to sink, the consideration of the nature of that fluid itself forbids the supposition. The most elaborate experiments have been instituted to determine the compressibility of liquids, and it is even yet doubted by some whether the amount of compressibility which has been apparently determined, is not due to defects in the method of experimenting. Be that as it may, it is probably true that no solid is so little compressible as water. It follows, therefore, that even if water were capable of being condensed so as to become of the density of lead under ordinary conditions, that a solid immersed in it and receiving the same pressure would also be condensed, and its specific gravity increased proportionally. Thus a body, if it begins to sink at all in water, must continue to sink until it reaches the bottom, unless the hypothesis that water solidifies under pressure be correct.

We have no reason to believe that this hypothesis is correct. On the contrary we have many reasons to disbelieve it. All experiment teaches us that when any gaseous or liquid body is rendered solid, it does not instantaneously resume the gaseous or liquid form. It must absorb the amount of heat which it lost when it became solid, it being a law that bodies when they become denser impart heat, and when they become less dense absorb it. It takes time in all cases to accomplish this, and the larger the mass operated upon the longer time it will take. In former ages the bottoms of oceans have been upheaved. In every case where upheaval has occurred we find a fossil deposit which has been proved to be organic in its origin. How would this be possible if the water at the bottom were in a solid state? If that were so, large masses of this solidified water would have been upheaved, having all this deposit upon its upper surface, the gradual change to a liquid state would have generated rivers, whose force would have broken up and carried along the fossil deposit, and distributed and arranged it in forms strikingly different from that in which it is always found. Moreover, it is impossible if this solid state exists anywhere in the sea, and especially if it is solid at the depth of three miles, that such depths could have been reached as we have stated were reached by Lieutenant Berryman. In all the experiments to which water has been subjected, there has never been the least indication that it could be solidified by pressure, and it is most improbable that if it were possible such indications should have totally escaped notice. But as we have shown that there was no need for this supposition, as the supposed fact for which it was intended to account does not exist, we will pass to what was probably the origin of the error.

The difficulties in sounding great depths are very great. Formerly the twine used was so light that when a certain depth was reached its buoyancy was sufficient to float the lead. It became on this account necessary to improve its quality and density so that its specific gravity should not vary greatly from that of sea water, while at the same time it should have enough strength to sustain the weight used in making the cast. Twine was thus perfected until it was able to sustain a strain of sixty pounds without breaking, six hundred feet weighing only one pound. With this twine having a 32-pound shot attached, very much greater depths than had been previously possible were reached. Small wire has been used in lieu of twine, and we believe the line used by Lieutenant Berryman in the soundings above alluded to was partially composed of wire. The second difficulty was the determining the precise moment at which the weight reached the bottom. It was found that when the ball had reached the bottom the line would continue to run out, being acted upon by the force of deep sea currents. The shock could not be felt at great depths, and thus it was necessary to devise some method by which this important detail should be made determinate. If a line be made fast to one side of a river, carried across and allowed to trail in the water, it will run out rapidly from the side where it is not fastened. In sounding when the ball reaches the bottom, the same thing occurs. The ball becomes immovable while the under currents acting upon the line carry it rapidly out. So long as this difficulty remained nothing certain could be ascertained. And still another difficulty was discovered. The counter currents made bights in the line, so that the length of line run out was not a correct indication of the depth reached. These difficulties were overcome by the inventions of Brooke and of Massey. The former invented a self-detaching apparatus by which the weight

when it reached the bottom would be instantly released. At the same time a small portion of the bottom would adhere to light hollow tubes attached to the line, so that when recovered the character of the bottom could be ascertained. The latter invented a small instrument by which the exact vertical distance traversed by the weight in its descent would be indicated. The form of the lead was subsequently changed to a double cone about two feet in length, having its greatest diameter four inches from the lower end, and tapering from this point to the top, where it was about two inches in diameter. Through the center of the lead, which weighed from one hundred to one hundred and fifty pounds, an iron shaft extended. In a hollow at the lower end pieces of quill barrels were inserted, which penetrating into the bottom retained a portion. When this apparatus was used on the steamer Arctic by Lieutenant Berryman, the detaching apparatus of Brooke was dispensed with as Massey's sounding machine was sufficient to determine the depth when enough line was run out to render it absolutely certain that the bottom been reached. Delicate self-registering thermometers were also attached to the apparatus, by means of which it was ascertained that the sea was much colder at greater depths than near the surface. With this apparatus the deep soundings we have described were made, and there is no doubt that they were very nearly correct.

CHROMO LITHOGRAPHY.

Without admitting all or nearly all that is claimed for it, we must admit that chromo-lithography is a wonderful art. It is not necessary to believe that the chromos so much praised by some of our exchanges are exact copies of the paintings they represent, to properly estimate their worth An exact copy of a painting was never yet produced; nor yet so nearly produced as to obtain the full effect of any truly great picture, whether it was done by the most skillful painter or by chromo-lithography. It is enough that a well-executed chromo is better than a badly painted copy, for most of the painted copies are bad. Chromo-lithography gives a good picture at a cheap rate, for which it is justly entitled to praise. The process is a difficult one, although the principles upon which it is based are simple enough. The effects most difficult to produce in chromo-lithography are those which are produced in painting by the blending of colors while they are fresh and soft on the canvass. This blending can never be produced in any other way so perfectly as the artist can do it with his brush, and it is the comparative absence of these effects which enables an expert to detect, even at some distance, a chromo from an oil painting. In the former, the colors are superimposed; in the latter, they are mixed.

Lithography is the art of drawing upon stone, and taking impressions of the picture thus produced upon paper. The prefix *chromo* signifies colored. The art, as practiced in Europe, and, until lately in this country, is entirely distinct from engraving. The stones from which the impressions are taken being perfectly *smooth*. Latterly, the last impression is taken from an engraved stone, by which a nearer approach to oil painting is secured. This improvement is due, we believe, to Mr. Prang, of Boston, and has greatly added to the artistical effect of the pictures.

The stone used is a peculiar species of limestone found in Bavaria, which is capable of receiving a very fine polish, beside possessing chemical qualities which render it adapted to the purpose. The stone is cut into plates of the proper size, as many plates being requisite as the different colors necessary to complete the picture. Each of these plates has a separate portion of the picture drawn upon it. The drawing is executed with a colored chemical preparation, which, upon the subsequent application of suitable re-agents enters into combination with the stone itself, and becomes permanent. The drawings are so made, that were they all superimposed upon each other, and the plates were transparent, by looking through them, the entire picture would be shown complete. The lines which constitute the drawing have an oily surface which repels water, so that when the stone is dampened with water, and printers' ink or oil colors are applied, the ink or the colors being repelled by the moistened parts of the plates, adhere only to the lines of the drawing. Thus, when an impression is taken, these lines only are transferred to the paper.

Every stage of the operation requires the most delicate and accurate manipulation. Conceive the difficulty of making a drawing on thirty different plates, each plate having upon its face numerous fragments of the entire picture scattered in different positions, the whole to be so accurately done that when one after another shall have been proved by an impression taken upon a single sheet of paper, a complete picture will be presented; and remember that a variation of a hair's breadth will destroy the work. Another difficulty is what is technically known to printers as registering. This means the placing of any number of sheets, always in the same position, upon the plate or form, in the press. The greatest accuracy is required here, as all the preceding nicety of workmanship counts for nothing unless this is secured.

The final operations consist in embossing and varnishing. The former gives the rough grained appearance to chromos which is seen in oil paintings, and softens the outlines of the picture. This brief sketch will give an idea of the methods employed in this art, which, if it can not equal, is familiarizing the American public with the works of the great artists, hitherto entirely inaccessible to those not having the means and opportunity to visit the galleries of Europe, where the most of them are only to be found.

THE smoke from the late volcanic eruption on the Sandwich Islands floated off in a line of one thousand miles across the sea, and was so dense that at a distance of 500 miles officers of ships were prevented from making their observations.

Submarine Telegraphy—A Curious Phenomenon.

The Memphis *Appeal* gives an account of a case which has very much perplexed the electricians. We allude to the late obstruction and restoration of telegraphic communication with the trans Mississippi. For some weeks past the cable has been working very irregularly. At intervals no communication could be had for hours, and all at once it would revive and the fluid pass through it as usual. This state of affairs continued for several weeks, and at last communication ceased entirely. After several ineffectual attempts to revive it, it was determined to raise it and find out the reason for the cessation. The cable crossing at this point is considered one of the best ever laid in this country, having been manufactured originally for the Red Sea, but for some reason not used, and afterwards was purchased and laid down by the Western Union Telegraph Company, at a very heavy expense. The operation of "under running" and taking the cable up was successfully performed by Colonel Coleman and Captain Baker, in a steam tug with a barge attached. As it was raised, and at intervals of a few yards, a needle was driven into the cable so as to touch the conducting wire, and instruments were applied to test the soundness of the portion raised. When near this shore by this means it was discovered that the disturbing cause lay within a space of twenty yards between two points. This piece was cut out, the two ends spliced, and the cable immediately worked throughout its whole length. The piece cut out was brought ashore and examined by Colonel Coleman and Captain Baker at their leisure, and developed one of the most singular facts in telegraphing that has ever come under their notice. On cutting the cable it was found that about four inches of the conducting wire had been burned out, and was gone completely. It is supposed that a severe shock of lightning had passed along the land line of wires, and had left them and followed the cable, burning this piece out in its passage. The curious and inexplicable part of the affair is the action of the cable after the burning. At times a current of electricity passed through and communication was kept up between Memphis and Little Rock; then ceasing entirely for awhile, it would again revive, keeping up this fitful action, as we have stated, for some time before its total suspension.

Many theories and surmises are advanced by the gentlemen connected with the telegraph office here as to the explanation of this remarkable phenomenon, the only one of which is at all satisfactory is that of Colonel Coleman, that 'a slight connection was formed between the burnt ends of the conductor by moisture which had penetrated the cable in sufficient quantities to keep up the circuit there being a battery on the Memphis end strong enough to drive the electricity through at intervals." This, says Colonel Coleman, to whom we are indebted for most of the above facts, is a remarkable case and may never occur again. The question now naturally suggests itself, cannot some mode be established whereby communications can be passed through large bodies of water without a cable? It has been proven it this instance that messages passed to and fro across the Mississippi without a metal connection. Let the scientific work it out.

Sleep--The Amount Necessary.

Prof. Dickson, in his Essay on Sleep, says the necessary amount must differ in the various tribes, as well as in different individuals, according to numerous and varied contingencies. The average proportion of time thus employed by our race may be stated pretty fairly, I think, at one third. The allotment of Sir William Jones, slightly altered from an old English poet, does not depart much from this standard:

"Seven hours to books, to soothing slumber seven,
Ten to the world allot, and all to Heaven."

The busy engagement of ambition and avarice may induce men to subtract more or less from their due repose, but any considerable deduction must be made at a great risk to both mind and body. Sir John Sinclair, who slept eight hours himself, says that in his researches into the subject of longevity, he found long life under all circumstances and every course of habit; some old men being abstinent, some intemperate; some active, and some indolent; but all had slept well and long. Yet he gives a letter from a correspondent, recording the case of an old man of ninety-one years of age who had slept through life but four hours a day. Alfred the Great slept eight hours, Jeremy Taylor but three. Dr Gooch tells us of an individual who slept only fifteen minutes in the day; but it is scarcely credible. Bonaparte, during the greater part of his active life was content with four of five hours' sleep; the same is said of Frederick the Great and of John Hunter. I know familiarly a person whose average has been even lower than this; I have heard his wife say that they were married four years before she had ever seen him sleep. Seneca is quoted as telling the incredible story of Mecænas, that he had passed three years without sleeping a single hour. Boerhave says of himself that he was six weeks without sleep, from intense and continued study. Statements like these demand close examination and clear proof.

Of long protracted sleep there are numerous and wonderful tales, from the story of the Seven Sleepers of Ephesus and their dog—to be found in the early legends of the Church; in the Koran, chapter of the Cave; all over the East, as Gibbon tells us; and even in Scandinavia—down to the exquisite Rip Van Winkle of our Washington Irving. In the *Philosophical Transactions* we read of one Samuel Clinton, a laboring man, who frequently slept several weeks at a time, and once more than three months without waking. In the *Berlin Memoirs of the Academy of Sciences*, there is a curious history of a lady of Nimes, who fell asleep irresistibly at sunrise, woke for a brief interval at noon, fell asleep again, and continued in that state until seven or eight in the evening, when she awoke and remained awake until the next sunrise.

Heat in Mines.

Every one who has had anything to do with mining knows that water is one of the most formidable enemies the miner has to contend with. It begins to flow in as soon as the depth of an ordinary well is reached, and must be pumped out, at great expense, to enable the work to proceed. The steam engine was first devised for the sake of providing power to do this pumping, and was for a Cornish mine that Watt invented his great improvement on the original machine.

Without this help many of the mines in England would be worthless; and as it is, some of them are limited in their depth by the difficulty and expense of getting rid of the water.

A curious fact has, however, been lately brought to notice in regard to the Nevada silver mines. Heat, not water, is the chief enemy encountered after reaching a great depth, and, instead of pumping out water, the companies have to pump in air. A Nevada paper says:

"The increase in the heat of our mines is now beginning to give many of our mining companies more trouble, and is proving a great obstacle to mining operations in those levels lying below a depth of one thousand feet than any veins or 'pocket' deposits of water yet encountered. A number of the leading companies on the Comstock are now engaged in putting in engines to be used expressly for driving fans for furnishing air to the lower levels, forcing it through large tubes of galvanized iron. With this great increase of heat in our mines comes a great decrease of water; in fact, in our deepest mine—the Bullion, which has attained the depth of twelve hundred feet—not a drop of water is to be seen; it is as dry as a lime-kiln and as hot as an oven. In the lower workings of the Chollar-Potosi mine, which are a perpendicular depth of eleven hundred feet below the surface, the thermometer now stands at one hundred degrees—a frightful heat to be endured by a human being engaged in a kind of labor calling for severe muscular exertion. Here also we find the water to have decreased till there is at the present time a very insignificant amount, it being necessary to run the pump but four hours out of the twenty-four."

This corroborates the theory of some geologists, that the interior of the earth is a mass of melted rock. Suppose one of these Nevada miners should accidentally make a hole in the solid crust, what would become of him?—*Sun.*

Editorial Summary.

THE largest tannery in America is claimed by Chicago. It belongs to the Union Hide and Leather Company. An exchange thus describes these works: They are situated on the north side of the Chicago River, and occupy nearly 5 acres, including docks The main building is 241 by 80 feet and 3 stories, and on this is a two storied superstructure 75 by 35 feet. The building is constructed without angles, inside, so that every workman is under the eye of the foreman. A steam elevator in the center of the building is used for hoisting purposes. The working force of the establishment is 100 hands, and its producing capacity 1 000 hides per week, including wax, buff and upper leather, and a small quantity of harness leather. About one half of this product is sold in Chicago, and one half in Boston. The beam-house is 140 by 41 feet, and the machinery in use comprises 3 Winn splitting machines, 2 scouring and 1 stuffing wheel, 1 hide mill, pumps, etc. The building is heated by means of 12,000 feet of 1½ inch pipe.

A DESCRIPTION of a clock which is apparently only a single plate of glass having the usual figures of the dial upon it, and a hand which keeps the time with apparently nothing to move it, is circulating largely among our exchanges. This is probably no new contrivance but an imitation of the celebrated glass clock constructed by Houdin, the French *prestidigitateur* many years ago, which was so ingeniously devised, that a person looking at it ever so closely could not discover the works, although he might to all appearance look entirely through the entire apparatus and see all the objects upon the opposite side of it.

A LARGE meat in a very hard nut to crack was found by some burglars recently in San Francisco. A safe which resisted their attacks for a long time and demanded all their skill as cracksmen, at last yielded, and was found to contain a large—joint of cold mutton. This, with a few other cold edibles, comprised the entire contents, the safe having been used for some time as a refrigerator.

A VENERABLE plow is announced for exhibition at the Maine State Fair It has a seven-foot beam of white oak, a stout iron colter, an oak share sheathed with iron, and a pair of ash handles, like immense davits, projecting four feet in the rear. The wood is seamed and wrinkled, but tough and sinewy still.

DURING the recent laying of the siphon under the Seine at Paris, one of the divers employed remained at the bottom so long as to excite the alarm of the attendants. The bubbles which arose indicated that he was alive and remaining stationary, but he could not or would not reply to signals. Another diver was sent down, who found his predecessor gloriously drunk, and enjoying a cosey nap upon the bottom of the river.

THE Rappahannock Canal was recently sold for the paltry sum of $1 500. It had ceased to be of any value as an internal improvement.

MANUFACTURING, MINING, AND RAILROAD ITEMS.

English Railways now run smoking cars on all passenger trains.

Houston, Texas, claims that she is destined to be the great railroad center of the South.

Cleveland is trying the experiment of concrete pavement between the rails of her horse railways.

The Egyptian cotton crop is reported for this year as 400,000 bales, against 250,000 for last year.

A quarry of stone, said to be equal to the best French burr for millstones, has been discovered near South Pass in Southern Illinois.

North Germany has now six iron clads, carrying in all seventy guns. Its entire naval force is 563 guns.

Pennsylvania has 4,311 miles of railroad; Ohio 3,398 miles; New York 3,345 miles; Illinois 3,224 miles. In 1860 Pennsylvania had only 2,503 miles.

The *North American* says a project is on foot to effect steam communication by water between Ohio and the Gulf of Mexico, at Mobile, passing through the Tennessee river past the Muscle Shoals, and connecting with the Coosa river by a steam canal thirty miles long.

Three hemp cables have just been completed at the Chatham dock yard for the British navy each twenty six inches in circumference, one hundred and one fathoms long, and weighing 13,000 pounds.

The Philadelphia *North American* says the Union Pacific Railroad is forwarding ninety car loads of construction material to the end of the track daily. A large number of snow plows have been placed at convenient distances in the mountains ready for use.

Before the war nearly 2,000 men were employed in various occupations in the Norfolk Navy Yard, while at the present time the number does not exceed 400.

The Hartford and New Haven Railroad Company are erecting gates on each side of the railway crossing on Main street, Meriden, to prevent loss of life and property, which hitherto have been constantly endangered.

During the first half of the present year France imported raw cotton to the amount of 230,384,183f., more than half of which came from this country The exportation amounted to 39,461,604f

The manufacture of smoking pipes in France has followed the ever-advancing increase of tobacco consumption, and represented in 1867 upwards of fifty-two millions of francs.

The deep-sea dredging expedition, in which Dr. Thomson, of Belfast, and Dr. Carpenter and son, of London, were engaged, is reported as having been generally successful. Some new species of submarine animals have been discovered.

Ten cars of the Atlantic and Great Western Railway were destroyed by fire recently. The fire was caused by an explosion in the forward car which is supposed to have contained nitro-glycerin. The engine was completely demolished, and the engineer seriously wounded, and the fireman slightly hurt. The cars were loaded with flour and pork. A house, a quarter of a mile from the wreck, was demolished by the concussion.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

STEAM BOILER.—John L. Thomas, Alliance, Ohio.—This invention consists in indicating the hight of water and the steam space by a revolving dial wheel operated by a chain and float, the motion of which wheel also operates a cock in the feed-water pipe, so as to control the quantity of water which is admitted into the boiler.

HORSE HAY RAKE.—Geo. C. Shaler, Gilboa, and Harry Barlow, Herbert, N. Y.—This invention relates to a new and useful improvement in horse hay rakes, the object of which is to rake and dump the hay or grain in heaps without scattering, and at the same time to keep the teeth of the rake clean and free from being clogged or chocked.

FANNING MILL.—George Richards and David Strickland, Richland Center, Wis.—This invention has for its object to improve the construction of fanning mills, so as to make them more convenient and effective in operation.

HAME FASTENER.—Wm H. Payne, Janesville, Wis.—This invention has for its object to furnish an improved hame fastener, simple in construction, durable, easily attached and detached, and which will hold the hames securely fastened.

CALORIC ENGINE.—H. D. Wallen, Jr., Fort Columbus, New York city.—The object of this invention is to provide a hot air engine which will work with better results than those heretofore made. The general features of the invention consist in the employment of two parallel cylinders, each cylinder being provided with air-heating chambers at each end. The cylinders communicate with each other through suitable ports opening from the heating chamber of one cylinder into the adjacent heating chamber of the other, and these ports are provided with valves, the timely operation of which is accomplished by suitable valve gear. The pistons are made by means of any suitable "lost motion" devices to move and rest alternately; one piston being at rest either at the top or bottom of the stroke, while the other piston is making the stroke towards the resting piston. This action allows time for the air to be received into and heated in the air chambers at either end of the cylinders, which is a prominent feature of the invention. Another advantageous feature is obtained in the utilization of the excess of pressure in the first cylinder to assist in actuating the piston of the second or auxiliary cylinder, whereby the expanded air of the first cylinder escapes into the second heating chamber and by its pressure assists to actuate the second piston to make its stroke while the first piston is resting.

HEATING ATTACHMENT FOR STOVES.—John Norris, Mount Pleasant, Md.—This invention is an improvement upon the "Ten-plate Stove," and consists in constructing one of the oven doors of the same with a bay, from the top of which projects a short tube or collar, which conveys heated air to the upper apartments of the house, by means of suitable pipes, and also, when the pipes are removed, serves for certain culinary purposes.

WATER AND STEAM VALVE AND CYLINDER.—Richard Gornall, Baltimore, Md.—In this invention the cylinder valves are worked by the direct action of the live and exhaust steam, without the intervention of tappets, eccentrics, cams, or any other device outside of the steam chest and cylinder.

FOLDING CHAIR.—Asahel C. Boyd, Grafton, Mass.—The object of this invention is to construct a simple, cheap, and light chair, which can be instantly folded into a very small compass, for convenience in packing, transportation, etc.

SOLDERING FURNACE.—Conrad Seimel, Greenpoint, N. Y.—This invention consists in a mechanism in which solder may be heated, and provided with an arrangement for supporting vessels in a convenient position for applying solder.

HEATER.—C. S. Doolittell, Mansfield, Ohio.—This invention has for its object to improve the construction of stoves, furnaces, and other heaters, in such a way as to utilize a larger proportion of heat than is possible with heaters constructed in the ordinary manner.

GRAVE MOUND.—Jonathan Meley, Trenton, Tenn.—This invention has for its object to improve the construction of grave mounds, so as to make them ornamental, and especially so that the mound may not be disfigured by the sinking of the grave.

CHURNING APPARATUS.—Edward J. Moore, Westfield, N. Y.—This invention has for its object to improve the construction of the improved churning apparatus patented by the same inventor April 17, 1868, and numbered 76,497, so as to make it more convenient and effective in operation.

ANIMAL TRAP.—Wilson McClure, Sinking Spring, Ohio.—This invention has for its object to furnish a simple, cheap, and effective trap, by means of which the animal may be killed when caught.

COMPOSITION FOR BUILDING BLOCKS, PAVEMENT TILES, ETC.—Samuel E. Carr, Danville, Pa.—This invention has for its object to furnish an improved composition for forming building blocks, pavement tiles, and for other similar purposes, which shall be cheap and durable, forming a hard and permanent structure.

LOCKING JOINT FOR HORSE HAY FORKS.—C. A. Howard, Pontiac, Mich.—This invention relates to improvements in locking joints for horse hay forks, and has for its object to provide a more simple and convenient locking joint than any now in use.

PACKING CAN.—N. P. Lindergreen, Boston, Mass.—This invention relates to improvements in packing cans, the object of which is to provide cans of the best form for packing, which shall at the same time be strong and durable.

MATCH COMPOSITION.—Wm. H. Rogers, New York city.—This invention relates to the use of new materials or ingredients for composing friction and other matches, whereby the match is made self igniting and combustible throughout its whole length, and whereby the match is made flexible and may be coiled like cord or wire in a small space.

LINE HOLDER.—D. W. C. McMaster, Southborough, Mass.—This invention relates to a device for holding clothes lines, cords, or ropes used for other purposes.

EVAPORATOR.—James Taylor, Canton, N. Y.—This invention relates to the evaporation of sap for making maple sugar, for evaporating the juice of the sorghum for making sirup or sugar, and of salt water in making salt.

COMBINED SQUARE AND BEVEL.—E. B. Foster and John G. Witt, Elmira, N. Y.—The object of this invention is to furnish on one article (or tool) a combination of various useful tools which are indispensable in the mechanic arts.

JOINT OR SEAM FOR SHEET-METAL BOXES.—E. A. Thomas, Philadelphia, Pa.—This invention relates to a new and improved joint or seam for joining the edges of the piece of sheet metal, which forms the body or main portion of a box or can. The object of this invention is to obtain a side seam or joint which may be made very expeditiously and perfectly tight.

FENCE.—J. M. Chaplin, Middleport, N. Y.—This invention relates to a new and improved fence of that class in which the pickets are attached to wires. It also relates to a new and improved manner of straining the wires and in attaching the pickets thereto.

HAY FORK.—C. H. B. Kellogg, Tontogany, Ohio.—This invention relates to a new implement to facilitate the handling of hay, and it consists in expanding and contracting hooks, or tines attached to a central movable rod.

WATER WHEEL.—Gardner Cox, Pierpoint, N. Y.—This invention relates to a new and improved water wheel, of that class which are secured to a vertical shaft and consequently rotate in a horizontal plane.

DUMPING WAGON.—G. B. Sneath and C. H. Sneath, Wilmington, Del.—The object of this invention is to provide a simple and effective dumping wagon. It consists, in general terms, of a wagon body, or box, arranged to tip backwards on a trunnion shaft, having bearings in the bed frame properly supported upon springs, together with other devices, the said bed frame being braced and provided with devices for relieving the trunnion shaft from the weight of the body or box when the latter is in its horizontal position on the bed frame.

AIR SPRINGS.—Jackson Corriston, Sandusky City, Ohio.—This invention relates to improvements in air springs for use on railroad cars, or for any other purposes for which they may be found useful. It consists of springs composed of a series of concave perforated sheet metal diaphragms, arranged in pairs reversely to each other, united together alternately at their outer and inner edges, and joined together at each end to concentric disks, and provided with an interior guiding tube secured to one end, and a plunger secured to the other end, which works in the said guiding tube, the two serving as a guide for the proper action of the spring while in use, and to prevent a collapse of the same if an opening should occur through which the air should escape. It is also provided with a valve for admitting air, and for closing to prevent the escape of the air after the spring has been filled.

PUMP.—C. H. Dreyer, Nashville, Tenn.—This invention relates to improvements in pumps, the object of which is to provide an improved double acting pump.

FEEDING ROLLER FOR EDGING SAWS.—E. C. Dicey, Montague, Mich.—The nature of this invention relates to improvements in feeding rollers for edging saws, and other similar purposes, whereby it is designed to counteract any tendency of the saw to draw the board out of a straight course.

PLOW.—M. Berdan, Maumee city, Ohio.—This invention relates to a new and improved means for attaching a subsoil share to an ordinary plow, whereby said share may be adjusted higher or lower as desired, and held very firmly in position when adjusted.

MACHINE FOR TURNING BROOM HANDLES.—G. M. Morrow, Clarksville, Ohio.—This invention is a machine for turning broom handles or other rods that require to be tapered, and consists in the employment of cam wheels, which compel the action of the bits together, with other devices perfecting the whole.

WAGON BRAKE.—Simeon R. Bolton, Prescott, Wis.—The object of this invention is to provide a simple and efficient braking apparatus for vehicles.

BABY JUMPER.—Charles Rich, Poughkeepsie, N. Y.—The object of this invention is to construct a baby jumper, so that with a simple apparatus it can be adjusted conformable to the weight of the child, and so that the child can be placed therein securely, that it cannot fall off its seat.

VISE FOR STRETCHING TELEGRAPH WIRES.—Geo. M Thompson, Boston, Mass.—The object of this invention it to construct a device for stretching telegraph wires, so that persons on poles can, with out one hand, apply the instrument and stretch the wire, while with the other hand they can hold fast to the pole

OPERATING PUMPS.—Charles W. Hoyt, South Norwalk, Conn.—This invention relates to a new and improved means for operating pumps and is more especially designed for those cases where the power cannot be conveniently applied in close proximity to the pump.

CAST IRON PIPE CORE.—John Enright, Louisville, Ky.—This invention relates to the construction of cores used in iron foundries in the manufacture of cast iron pipe, and it consists in forming the core of iron or other metal and in such a manner that the core is made so as to be expanded and contracted.

LEACH TUB.—Wm. Banzett, Brooklyn, E. D., N. Y.—This invention relates to a new manner of securing the cover to a standing leach-tub, and consists in the use of an elastic packing strip, interposed between the edge of the tub and the cover, and of a series of hooks pivoted to the tub by which hooks the cover can be securely clamped upon the tub, yet so that it can be easily removed when desired.

CAKE MIXER.—James Lafetra, New York city.—This invention consists in the use of two fingered stirrers, suspended from the cover of a tub, one of the stirrers being stationary and the other rotating; the stationary fingers project upward from the lower bar of a yoke, while the rotating fingers project downward from a cross bar that is attached to a shaft, having the bearings in the cover. The rotating fingers pass between the stationary fingers and keep the contents of the tub well stirred.

VISE.—John C. Crumpton, Philadelphia, Pa.—The object of this invention is to provide a wrench which may be constructed more cheaply and which will be more durable and convenient than those now in use. It consists in the arrangement of the front jaw, bed piece, and shield for the screw in one piece, also in the arrangement of the sliding jaw in connection with the said bed piece and shield and also in the method of adjustably connecting the vise to the bench.

GAITER BOOTS.—W. H. H. Babbitt, New Corner, Ind.—This invention relates to an improvement in gaiter boots and is confined to the fastening of the gaiter around the ankle and to the parts connected therewith, whereby the fastening is rendered durable and the ankle is properly supported.

STEAM GENERATOR.—V. D. Anderson, Milton, Wis.—The object of this invention is to provide a simple and economical steam generator for domestic uses.

DEVICE FOR UNLOADING HAY.—Joseph Backus Greenvale, Ill.—This invention relates to a device for unloading hay from wagons, if upon stacks, and consists in the construction and arrangement of a derrick, which can be used for the purpose of transferring the hay from the wagon, and in a new device for holding the hay while the same is being transferred from the wagon to the derrick.

BUCKET FOR CHAIN PUMP.—Orrin O. Witherell Lewiston, Me.—This invention relates to an improvement on that class of chain pump valves, in which a rubber or other elastic plate or ring is clamped between two metal plates, and the invention consists in the use and arrangement of a screw by which the parts are held together.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisements at $1 00 a line, under the head of "Business and Personal."

☞ *All reference to back numbers should be by volume and page.*

J. T. R., of Pa.—Eggs may be preserved by packing them in salt, pickling them in brine, or varnishing them by a solution of gum arabic in water. The best way is to apply the solution first, and then pack them in salt. The package should be frequently turned to prevent the yolk from settling to one side of the shell.

H. B. L., of Mass.—"Why are rubber diaphragms not adapted to water meters?" Such diaphragms are used, and we have never heard any objection made to their use, except want of durability. Those who use them state that they will last well, provided they are not required to perform much work in the driving of valves etc.

W. H. M., of Pa.—Hollow mills or cutters used for turning studs or stems which cannot be swung in a lathe, are frequently split in hardening from the neglect to drill a small pin hole through one side to the bottom of the drilled cavity to permit the escape of the steam generated in the process. Give this chance for escape and the milling tool will not crack.

A. B. T., of Mass.—You are wasting your time in filing and draw-filing your turning tools. First, because no file finish will stand hardening, tempering, and work, so well as a grindstone finish, and second because a good tool forger ought to make a tool so that it would require nothing but the grindstone.

M. S. P., of Pa.—Wenderoth, the distinguished photographer of your city, makes a varnish suitable for preparing photographic prints to receive colors.

H. C. D., of Mass.—In the proper use of the mouth blowpipe the air is very little vitiated by passing through the mouth. Of course the purer the air, the hotter the flame will be.

C. H., of N. Y.—We decline your communication on the use of sulphuric acid in photography. The suggestions it contains are impracticable. We publish this week an article on lithography. We know of no work that treats of the subject in full, as the art is now conducted.

C. W. M., of N. Y.—To coat iron with zinc or tin, clean with dilute sulphuric acid and a scratch-brush. Wash thoroughly, and immerse it in melted zinc or tin. When tin is used dust the iron with sal ammoniac before immersion.

J. H. P., Conn.—A pipe filled with water, having its upper end closed and the lower one open, will not retain water if its diameter is so great that capillary attraction will not keep the fluid column from breaking. Neither will water be retained in the long leg of a siphon having the end of the shorter leg closed when the diameter of the pipe is too great. The maximum diameter at which this effect may be obtained varies with the material of the tube and the nature of the fluid. When the tube is of glass, and the bore is about one-tenth of an inch, water will be retained unless the tube be smeared with some substance which repels water. When thus retained, the force which keeps the water in the tube, is chiefly the pressure of the atmosphere upon the exposed end of the fluid column. A column of water cannot be sustained at a hight exceeding 34 feet at the level of the sea.

Business and Personal.

The charge for insertion under this head is one dollar a line.

Proposed Railroad Suspension Bridge Across the Hudson River.

Our engraving presents a view of the new suspension bridge proposed to be thrown across the Hudson River to connect the great West directly with New York and Boston. The engraving was taken from the drawings of General Edward W. Serrell, the engineer-in-chief of the bridge company. On the 8th of this month the board of engineers and directors made an excursion on the river to examine for a proper site. The precise locality has not yet been determined, but it will be somewhere between Verplank's Point and Buttermilk Falls. The proposed bridge is one link in the railway intended to connect the Erie road with railroads on the east side of the river. The road will run from Turner's, on the Erie railroad, to Derby in Connecticut.

The following are some of the dimensions of the proposed bridge: Clear span, 1,600 feet; length of bridge between the towers, 1,665 feet; total length, including approaches, 2,499 feet; height of bridge above high-water, 155 feet; height of towers above the water, 280 feet; working safe load for the railroad lines, 2,400 tuns; working safe load for the highways, 2,880 tuns; total safe load for the bridge, 5,280 tuns; load that would break the bridge, 25,171 tuns; miles of steel wire in cables, 70,302; total weight of iron and steel in the bridge, 17,005 tuns; total amount of masonry, 58,084 cubic yards; total suspended weights, 9,651 tuns.

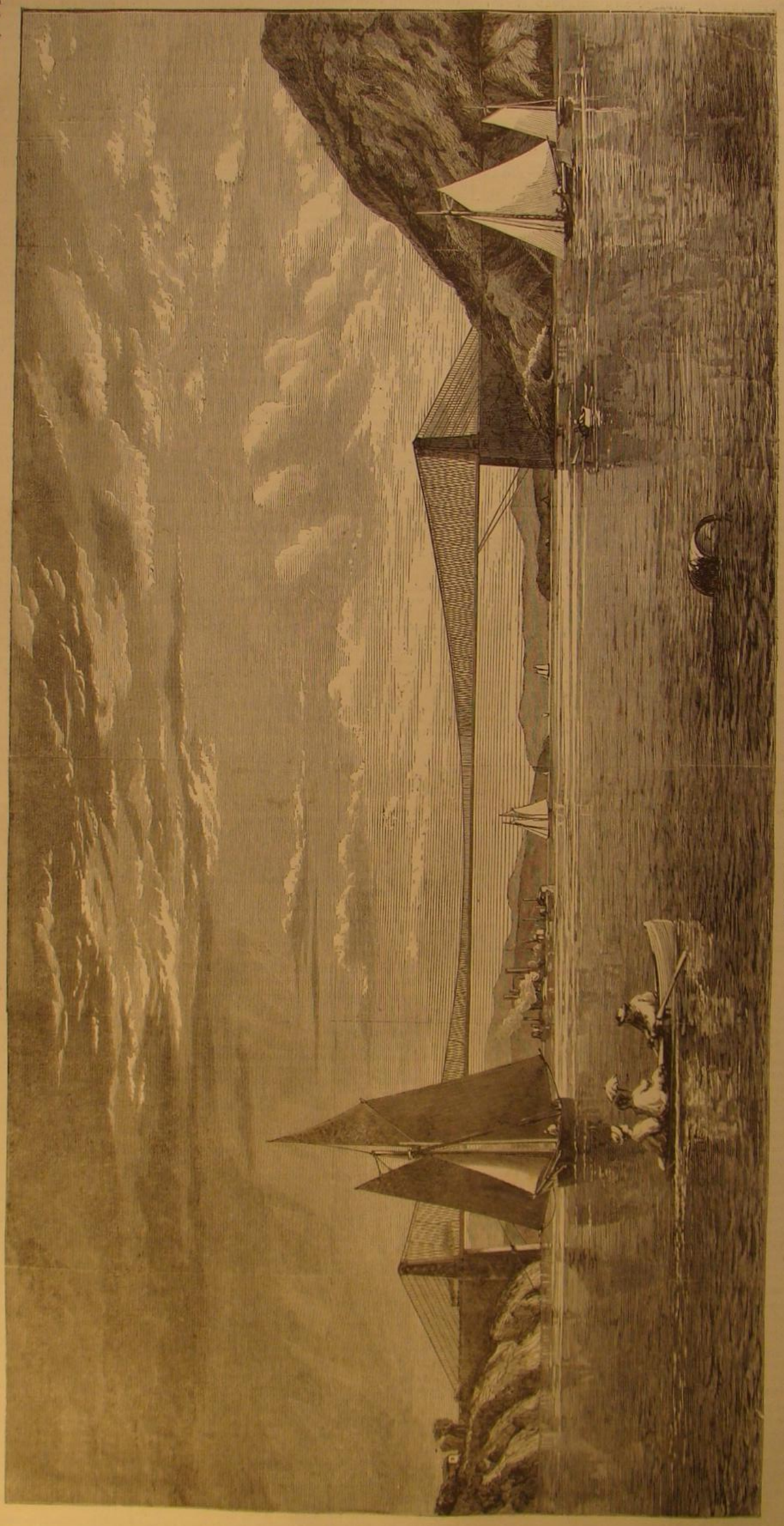
There will be twenty cables, in four systems; each cable will be 14 inches in diameter. The bridge will carry at one time 32 passenger cars: it would carry safely 34,560 people and 60 locomotives, if they could be placed upon it at once; 18,000 people and 53 locomotives would fill it. From the dimensions given above, it will be seen that this bridge will be longer than any one yet built on the continent, though a span of 1610 feet is projected in the bridge undertaken to be built across the St. Lawrence at Quebec.

These figures will show the enormous strength it is proposed it shall possess. New York city and every part of the country, east and west, are interested in it, and it is to be hoped the work upon the ground will soon be entered upon vigorously.

East Indian Opium.

At Patna is one of the two great opium factories of India. It is the greater of the two, and may, therefore, be safely styled the largest poisoning agency in the world. The establishment faces the river Ganges, whose bed is here four miles across—at this season a desert of caked mud, with the river far away on the other side of the waste. The opium is shipped to Calcutta in a steamer, and it is a good instance of the fickleness of Indian rivers—those plagues of engineers—that last year, and for many years before, the sacred stream ran so close to Patna, that wharves were erected from which the chests could be put right on the steamers, and where the timber wherewith to make the next year's chests could be landed. This year the chests have to be carried a mile or so before being shipped.

This opium-packing for 1867 was just over at Christmas, and nearly 30,000 chests of China opium had been sent down to Calcutta, worth about £4,000,000. Each chest contains 40 cakes—the dark, sticky stuff, ingeniously inclosed in a coating of dried poppy-leaves, so that each cake (weighing about two pounds) presents the appearance of a Dutch cheese or a cannon-ball. It has given rise to the saying that in war the British gave the Chinese cannon-balls of iron, and in peace cannon-balls of opium, thus giving them the choice of being shot or poisoned, and making them pay smartly for either attention. In return for this, they feed us with tea and clothe us in silk, which seems to show a truly celestial spirit.



SUSPENSION BRIDGE OVER THE HUDSON.

Scientific American.

MUNN & COMPANY, Editors and Proprietors.

PUBLISHED WEEKLY AT
NO. 37 PARK ROW (PARK BUILDING), NEW YORK.

O. D. MUNN. S. H. WALES. A. E. BEACH.

☞ "The American News Company," Agents, 121 Nassau street, New York.
☞ "The New York News Company," 8 Spruce street.
☞ A. Asher & Co., 20 Unter den Linden, Berlin, are Agents for the German States.
☞ Trubner & Co., 60 Paternoster Row London, are also Agents to receive subscriptions.
☞ Messrs. Sampson, Low, Son & Marston, Booksellers, Crown Building 188 Fleet street, London, are the Agents to receive European subscriptions or advertisements for the SCIENTIFIC AMERICAN. Orders sent to them will be promptly attended to.

VOL. XIX., No. 18...[NEW SERIES.].... *Twenty-third Year.*

NEW YORK, WEDNESDAY, OCTOBER 28, 1868.

Contents:

(Illustrated articles are marked with an asterisk.)

NEW AND IMPORTANT PATENT OFFICE RULE.

Commissioner Foote, in his firm purpose to break up certain practices in vogue in the Patent Office, has promulgated a very stringent and important rule, which ought to be understood by all inventors who intend to apply for Letters Patent.

It has hitherto been the custom of the Office to permit applicants, or their attorneys, to withdraw papers either before or after a rejection, for the purpose of making amendments. Hereafter this practice will not be allowed. Papers once filed must remain in the Office, and are not to be inspected for any purpose whatsoever, either by the applicant or his attorney.

The rigid enforcement of this rule renders it doubly important that specifications and drawings should be carefully prepared, in the first instance, by experienced and competent attorneys, and not by those who have little or no knowledge of the rules and practices of the Patent Office.

We admit that the new rule will operate somewhat severely upon such inventors as do not feel able to employ an attorney, yet we doubt not Commissioner Foote has had good reasons for promulgating the rule.

A BRITISH AMERICAN INTER-OCEANIC RAILWAY.

One of the papers read before the British Association related to a proposed railway to cross the American continent on a line lying wholly north of the United States. The author of this paper, Mr. Waddington demonstrated that the Pacific Railroad now so rapidly approaching completion would eventually throw the entire carrying trade between Europe and the East into the hands of the United States unless competitive measures were adopted. The only means of preventing such a result are in his opinion the immediate construction of a rival railway through the British possessions. The line he proposes, is from Ottawa to Fort Garry, 1165 miles; thence to Jasper's House, a further distance of 1,100 miles, thence by the Yellow Head Pass, 620 miles to the head of Bute Inlet opposite Vancouver's Island; the entire distance being 2,885 miles. He gives as a rough estimate of the entire cost of the road, rolling stock, stations, etc., the nice little sum of one hundred and thirty-five millions of dollars. But the cost is not to be considered as a serious matter when the results are properly estimated. Here is the argument:

"We shall be told that such an outlay is far too great to be thought of. But what we have to consider is not merely the amount, but the object to be attained, and whether that is commensurate with the outlay. If the commercial supremacy of England is at stake—and that has been pretty clearly shown— what are twenty million pounds sterling compared with the sad downfall which must inevitably follow such a loss, and the decay and ruin of our country? Never was so large a sum more usefully, more wisely applied; and in vain might we ransack the history of our national debt to find a parallel. In times past a single subsidy to some Continental potentate has cost more."

The history of the national debt of England, shows that heretofore no amount of money was considered too large to be used for the assertion of national and commercial supremacy. If then the facts are as stated by Mr. Waddington, there is little doubt that the money would be forthcoming, if the project were proved to be feasible and likely to pay. These are in our opinion big *if's*, and although he claims that the severity of the climate has been exaggerated; that the country between Ottawa and Fort Garry is with a single exception, north of Lake Superior, level and fertile; that the difficulties in crossing the Rocky Mountains though serious can be surmounted, it is impossible for us to conceive how the road could become self-paying, as Mr. Waddington believes, in six years from its completion, if indeed it would ever become so. The past history of railroad enterprises has shown that such projects must be based upon something more than the advantages secured by the location of their termini. There must be enterprise, manufacturing and agricultural facilities along the lines sufficient to warrant increase of freight and travel from intermediate points. The route under consideration has neither of these advantages. Its climate would always prevent its competing with the Pacific Railroad for passengers, and it is too distant from the seaboard to become a manufacturing district. Altogether we think that this road would if built, become the most extraordinary white elephant ever owned by the British Government.

PREHISTORIC ARCHEOLOGY.

Man's first appearance upon the earth, or rather the time of his first appearance has, in the light of modern science, become a most interesting subject of inquiry. It seems already established that this event took place much further back than has been usually believed. Such an announcement as this would have been much more startling a few years since than it is now, when it has come to be acknowledged that the Mosaic account of the creation of the world conflicts with science only so far as it is imperfectly understood. The six days, in which all things were created, has been shown to mean six distinct periods in which the great work was accomplished, the appearance of man being the last and crowning act.

The orthodox world is no longer alarmed at the relative attitudes of science and theology. It has come to see that time is no element in the working of the allwise Creator, and that by whatever process creation was accomplished, the same power must be acknowledged. To draw an argument from a celebrated biblical author. Everything that exists either always existed, or it had a beginning. Grant a beginning, and you admit a cause. An examination of the works themselves gives the evidence of intelligent design. Therefore, the cause is an intelligent one. By the same method, all the attributes of deity may be discovered, so that without the Bible, God is revealed in His works.

Should man, therefore, be found to have existed for six millions of years, instead of six thousand, the fact proves nothing adverse to revealed or natural religion. It strengthens them rather. For certainly the methods which science reveals are more in accordance with the nature of an infinite and allwise being than the interpretations which have been given to the Mosaic record. That record states the fact, and the order in which creation took place, and science fully sustains the record. The precise length of the periods, which have been rendered "days," has nothing to do with the matter. Creation is still going on around us every day, every moment. A grain of wheat is no less created now, than at the beginning, and the same power that created it then creates it now. But creation is now a gradual process, and the multiplication of species, was undoubtedly a long and gradual work, but a *work* nevertheless.

The science of philology has been one of the instruments by which the prehistoric existence of man has been determined, but we can not in this article attempt anything further than a mere recognition of its aid in solving the problem. The theories of Agassiz, and others, regarding distinct geographical centers of origin has also had much weight in forming opinions upon this subject, but the proof of the existence of man at very remote periods, is based upon more solid grounds than either of those we have mentioned. Not only the implements and utensils of man, but human bones have been found, in positions, and under circumstances which give undoubted evidence of very great antiquity. The veteran geologist, Lyell, has fixed the antiquity of some of these remains at two hundred thousand years, which is considered by many as too small.

In view of these facts, the examination and study of human remains, everywhere, are becoming of the greatest interest, and prehistoric archeology is assuming the proportions of a science. It has its facts, and the conclusions based upon them are rapidly being systematized. The "whence and whither," of mankind are the most interesting subjects which the mind of man can contemplate, and although the latter is the one of most vital importance, there is a peculiar mystery about the origin of man which must ever render it peculiarly fascinating to scientific men.

ALCOHOL---ITS NATURE, USES, AND EFFECTS.

While we never intend to use the columns of the SCIENTIFIC AMERICAN as a vehicle for the promulgation of the ideas of extremists, either in science, mechanics, or morals, nor to assume the rôle of teacher of morality, or social science, yet the domain of the moral reformer so often trenches upon or overlaps the province of natural science and the arts, that it would be strange indeed, if we did not recognize the fact. No product of natural or artificial chemistry—if such a term may be allowed—has ever had so widespread and searching an influence on the social habits and personal morality of men as alcohol. The nature and the use of this agent then is worthy attention, even if viewed simply in a scientific light. Such a view comes properly within our domain, as the editors of a scientific and mechanical journal.

Common alcohol is designated by the formula, $C_4 H_6 O_2$—Carbon, 4; Hydrogen, 6; Oxygen, 2. It is called by some writers the "spirituous or intoxicating element in all intoxicating liquors;" by others, "rectified spirit." Wine drinking peoples seem to agree in the name by which it is designated. The French call it *Esprit de vin;* the Germans, *Rectificirter Weingeist;* the Italians, *Acquavite rettificata;* the Spaniards, *Espiritu rectificado de vino*—spirit of wine, or rectified or purified spirit of wine.

But whatever may be learned of its composition, we judge of its qualities more by its effects when used. It is a natural result of one kind of decomposition called fermentation; and this fermentation, and the consequent production of alcohol is not confined to the action of the still, nor to influences outside the human organism. As an instance in support of the latter statement, we may mention that we have repeatedly seen an old Micmac Indian get "gloriously" drunk on sweetened water, a solution of common brown sugar in water. In this case the fermentation could not have taken place in mixing and dissolving in the tumbler, but in the Indian's stomach.

Ginger pop, root beer, ale, all fermented liquids, and vinegar (unless formed by the distillation of pyroligneous acid), contain more or less alcohol; and these so-called harmless beverages depend as much for their exhilirating quality upon the alcohol they contain as on the carbonic acid gas in their composition. It may be possible, for one whose stomach is unused to stimulants, to feel sensibly, after drinking these beverages, the same effects, although in a less degree, that the habitual drinker seeks in the rum or whisky bottle. But it is hardly to be credited that the stomach would contain enough of these liquids to produce real intoxication.

We judge of the nature of alcohol by its effects on animate and inanimate bodies. Take the latter, first. Alcohol is one of the best, if not the very best antiseptic known. Matter, which could be by no other means so well preserved from decay, change of form, or alteration of structure, is held *in statu quo* by alcohol. Extracts of the qualities of herbs, minerals, and animal substances, useful in medicine and the arts, can be preserved in their purity and power by no other agent so well. Beside its antiseptic qualities, alcohol is a stimulant, aiding in the effect of the drugs or extracts with which is combined. It stimulates the physical forces of the human system, when rendered inactive by disease; it is a "force-put," a "make-shift," as mechanics would say; useful to keep the enfeebled body from the grave, and to impart new life to organs almost past sensation by other means.

And there its usefulness ends. It never imparted additional strength to the robust; it never made the old young; it gives nothing; it only acts on what there *is*. When pure, it is a deadly poison, antagonistic to life. Its effect on the lining of the stomach, intestines, and other internal organs—the mucous membrane—can be produced even upon the epidermis or external skin, to such an extent as to blister. Alcohol does not assimilate—has no affiliation with the secretions of the human organism. It passes out of the stomach in precisely the same condition in which it entered it. It shows itself in the breath of the habitual drinker, in his perspiration, his evacuations. It is still alcohol. Part may be retained in the blood, which it thins and weakens. For a time it is held in the brain, stimutating it to unnatural activity; but it leaves the organ as it was before, or rather enfeebled by the task it performed while under the subtle influence of the wine spirit.

But we shall not be betrayed into a homily against the use of alcoholic stimulants. We desire only to present the facts, and leave each to judge for himself. We are aware that eminent physiologists, and others, have written labored defences of alcohol; but those who have experienced its effects upon themselves—on their physical system—leaving out its influence on their mental powers, are well fitted to judge of the value of the statements, arguments, and facts, produced by these defenders of the habitual use of a rank poison. Plain, palpable facts, are stronger than philosophical disquisitions; but, *chacon a son gout.*

THE NORTH POLE AND ITS SEEKERS.

North of Spitzbergen the Atlantic Ocean is exceedingly deep. Soundings have been attempted, and, although a mile or more of line has been used, the bottom has not been reached. The warmer currents, of which the Gulf Stream is the most notable, flowing from the Equator toward the pole, of course keep the surface, while the cold currents flow near the bottom. This well known fact has led to the belief that there must be, somewhere, a limited region where the warmer currents, meeting, would form a sort of eddy, and constitute an open polar sea. The observations of explorers have given strength to this belief. An exchange, in discussing this part of the subject, remarks that "the great Gulf Stream which is continually pouring an enormous volume of water—far warmer than the ocean through which it flows—into the Arctic Seas, must largely affect the condition of the North Polar regions. Where this stream finds an outlet, and by what course its waters find their way round Greenland into the Baffin's Bay current, are yet moot points among seamen. But whatever opinion we may form on these questions, there can be no doubt that an enormous quantity of heat is liberated somewhere in the neighborhood of the North Pole through the agency of the Gulf Stream; and it is far from being impossible that, during summer, at any rate, the circumpolar ice fields are wholly melted away."

"It is a singular fact, that in whatever direction the North Pole has been approached, traces should always have been noticed of a comparatively warm circumpolar sea or Polhynia. Baron Wrangel started northward from the coast of Siberia, over the vast fixed ice fields which cover the Arctic Sea there. He supposed that these extended far toward the North Pole, but before long he found open water, and was compelled to

abandon his attempt to reach the Pole in that direction. When De Haven went in command of the American expedition in search of Sir John Franklin, he was told in his letter of instructions that when he had gone far up into Wellington Channel he was to look for an open sea to the northward and westward. He did so, and saw in that direction a "water sky." A few years later Captain Penny found open water there, and sailed upon it. We have seen that Dr. Kane, in 1855, saw open water from the northern extremity of Kennedy Channel, and our readers will scarcely need to be reminded of the evidence which Dr. Hayes' recent voyage affords of an Arctic Ocean extending far to the north of Greenland. In the year 1818, again, Barrington and Beaufoy called the attention of scientific men to the evidence of Dutch captains, who asserted that they had approached within two or three degrees of the Pole, that they had there found an open sea, which was heaved by a swell that showed it to be of wide extent."

Dr. Kane, also, infers the former existence of open water further south than its has been discovered, from the traditions of the Esquimaux. Such traditions rarely are found to be without good foundation.

Admitting the existence of a permanent, open sea around the pole, the question, "can it be reached by vessels?" is natural in view of the efforts now being made to accomplish that object. So far, every attempt to penetrate to it has been prevented (unless it were actually reached by Penny) by an impenetrable wall of ice. Navigators have sought in vain for leads through which their vessels might be forced, and many have been forced to abondon them in the ice-locked channels which have closed only too surely behind them. Is there a permanent and fixed break somewhere in this ice wall, a gate ever so narrow, ever so perilous by which access can be obtained to the mysterious Polar Sea? As yet practically undecided the question finds some who believe yes, and others who believe no. Both parties find arguments to sustain their position. It is argued that the tides which rise and fall in the open Polar Sea, could not occur unless there were some large inlet communicating with the main ocean. To this it is answered that the sea is sufficiently large to admit of an independent tidal wave. Maury, while admitting that the ice wall would be a complete obstacle to the tidal wave in the Atlantic, takes this ground. He says: "I apprehend that the tidal wave from the Atlantic could no more pass under the icy barrier to be propagated in the seas beyond than the vibrations of a musical string can pass a fret on which the muscian has placed his finger. These tides must have been born in that cold sea, having their cradle about the North Pole."

Others hold that the tidal wave of the Atlantic finds its way into the Arctic Ocean round the northeastern shores of Greenland, although barred off on the side of Kennedy Channel. An adverse opinion is based upon the appearance presented by the planet Mars, whose atmosphere resembles greatly that of the earth. The white spots at the poles of Mars never entirely vanish, although, in the summer, which that planet has, as well as the earth, they become less conspicuous It is argued from this that the open sea at the North Pole is not permanent in form or position. It is also argued with much force that the statements of different navigators confirm this view; as where one has found open water others have failed to find it at the same season, and *vice versa*. The question must yet remain open, as there are approaches to the pole which have never yet been thoroughly explored. A definite answer will, no doubt, be given by the combined observations and discoveries of the different expeditions already far on their way to the north.

The German expedition, when last spoken, was in 80½° north latitude, having failed to reach the eastern shores of Greenland in latitude 75°. At that time it was still sailing northward. The Swedish expedition, when last heard from, was in latitude 80°. The route which these expeditions have taken, although on many accounts very promising, has nevertheless been fruitful of failure to other navigators. In 1607 Hudson reached 81½°. Cabot had previously reached a high latitude in the same waters. In 1827 Parry made the attempt to reach the North Pole by sailing as far north from Spitzbergen as possible, and then resorting to boats and sledges. A reward had been offered the party, if they should succeed in reaching eighty-five degrees, but they only reached a point 120 miles distant from that latitude. Here they were carried back by the ice as fast as they could advance upon its surface, the entire ice field being found to be floating steadily toward the south.

Whether the present expeditions are to be more successful remains to be shown. Meanwhile we shall be obliged to remain in suspense, as probably the last news of them has reached us until their return, if that event ever takes place.

AMERICAN SILK MANUFACTURE.

The entire value of raw silk produced in the world amounts annually, in round numbers, to two hundred and fifteen millions of dollars. The value of silk goods manufactured in France, amounts annually to nearly one hundred and fifty millions dollars. The United States have been and are still the best customer for French silk goods. Possessing mechanical skill equal to any nation on earth and unequaled manufacturing facilities, we have yet allowed our gold to flow out in a constant current, to purchase French goods. For this there have been two reasons. First, the difference in the current rates of labor existing in Europe and America; and second, the hitherto inferior quality of goods produced in this country. The first of these reasons might have been remedied by a proper tariff upon imported silks; but so long as the second remained, there would have been nearly the same demand for manufactured silks from abroad, as the inferior article produced in this country would not have found favor with consumers of such goods. A good article of silk goods will always be preferred, without regard to its price.

Both these obstacles to the progress of silk manufacture in America are now removed. The present tariff on foreign silks enables our manufacturers to compete with European labor, while the quality of goods now produced here is in many instances equal if not superior to the imported. In order to bring the manufacture of silk to its present state of perfection in the United States many difficulties had to be surmounted some of which we shall notice at length.

The peculiarities attending the manufacture of textures from any particular fiber, depend upon the nature of the fiber itself. The machinery used must be adapted to these peculiarities. Cotton is worked dry, the fibers admitting of being drawn in any direction; that is, two fibers of cotton laid side by side will slide one upon another either way. Two fibers of wool laid thus would be found to slide only in one direction, the wool fiber being barbed or serrated. Wool, therefore, can not be drawn out like cotton, and it requires to be oiled in order to reduce the tendency of the fibers to cling to each other in the process of carding. Flax needs to be wetted before it can be spun, in order that the fibers may be evenly drawn out, and distributed so as to make a uniform thread Silk fiber differs very materially from any other used in textile fabrics.

Silk is a hardened thread of gum, secreted by larvae of different species of the Phalaena genus of insects. The thread is composed of two filaments, which are spun simultaneously and cemented together. When wound into the cocoon, the coils mutually cohere to each other, but readily separate upon being immersed in warm water, so that the entire thread can be reeled off. As many of these filaments as may be desired to give a thread of any required size are reeled off together, and become cemented so as to form one thread. In this state it is the "*raw silk*" of commerce. When this thread is twisted, to add to its strength and firmness it is technically called "*singles*." Two or more *singles* twisted together form *tram* silk, which is generally used for the *shoot* or weft in weaving. When two singles are twisted together in an opposite direction to that in which the singles are twisted, *thrown silk* or *organzine* is the name given to it, and the process is called throwing. The lengths of filaments vary from 300 to 600 yards in a single cocoon. When the filaments are to be joined no knot is necessary, the natural gum on the silk being sufficient to effect the junction. The raw silk used in America is chiefly imported. It comes in the form of packages, each containing more or less silk as well as different qualities according to the quarter from which it is obtained. The several operations through which this silk passes in forming the different textures, are winding, cleaning, spinning, doubling, throwing reeling, dyeing, and weaving or braiding. In each of these operations, special regard is necessary to the peculiar nature of the material, its elasticity being a prominent feature.

On a recent visit to the establishment of the Dale Manufacturing Company, in Patterson, N. J., we witnessed the entire process of silk manufacture, and as the success realized by these and other works settles all doubts as to the entire practicability of the silk manufacture in this country, we believe that we can not furnish more valuable matter of information to our readers than a description of them

The ground plan of the mill is in the form of a T, the main portion having an extension from its center 50 feet in width, running 100 feet back from the rear. The main part of the building is 275 feet in length, 50 feet in width, and four stories high The building was designed by and built under the supervision of Thos N. Dale, Esq., President of the company, the entire labor being performed by day's work. The walls are twenty inches in thickness, and the building is as substantial a specimen of architecture as any structure we have seen designed for manufacturing purposes.

A portion of the lower floor is occupied by a spacious office, which opens into a large storeroom. In this storeroom is an enormous fire-proof safe for storing the raw material, etc., capable of containing millions of dollars worth of goods. From the lower floor of the extension above referred to, project two minor extensions, one each side. The first of these contains the dye works of the establishment, and the second the engine and boiler. These are so situated that in case any explosion should ever take place, the main building would not be jeopardized. The engine is of the well known Corliss make, and is of eighty horse-power. The entire building is heated by steam, and ample provision is made for the extinction of fire which, however, is less likely to occur than in cotton manufactories. The portion of the first floor not occupied by the office and storeroom is devoted to winding and cleaning. The raw silk is here placed upon reels, and from thence wound on to spools. The reels are six sided, and are technically called swifts. They are adjustable to suit the sizes of the hanks, and balanced so that they will not break the threads by irregular motion. By means of weights enough friction is produced upon their axes to keep the threads stretched. The bobbins have each an independent motion, and any one can be taken off and replaced without interfering with the others. An eye through which the thread passes to the bobbin has a traverse motion, by which the thread is wound obliquely, and lateral adhesion is prevented. Constant care, watchfulness, and intelligence are necessary in this as well as in all the subsequent operations.

Cleaning is performed by fixing the bobbins horizontally on plain spindles, and passing the thread between two adjustable pieces of metal. Should a knot or other unevenness chance to be on the thread, these pieces of metal prevent it from passing through, the plate of metal is depressed and the bobbin is lifted off the friction roller which gives it motion, The stoppage being perceived by the attendant, the defect is removed and the work proceeds. The silk being cleaned, it is next spun. The second floor is devoted to this operation. The spinning is, however, only the twisting of the threads, the real spinning having been done in the outset by the silkworm. The twisting is effected by passing the threads required from the bobbins upon which they are wound, to other bobbins placed on spindles provided with flyers, through the eyes of which the threads pass. The amount of twist is regulated by the velocity of the second series of bobbins, which have the usual traverse motion.

When the threads are twisted they are next doubled, that is, several of them are wound together upon the same bobbin. They are next twisted together upon frames precisely like those used for spinning. This process is called throwing or spinning, and the silk after it is thus twisted is called *thrown silk*. The doubling frame is provided with independent stop motions, one for each thread, so that when any one breaks the bobbin upon which it is being wound stops, until the thread is mended by the attendant and set in motion again.

The silk is now ready for the dyer. It may be dyed in a *hard* or *soft* state, that is, with the gum on, or removed by long boiling with soap and water. The proper estimation of the amount of gum removed is most important, as throughout the whole process of manufacture weight is the basis of value, and the check upon employés. The amount of loss in cleaning is usually 25 per cent. The most admirable system prevails in the works of this company, involving the most strict methods of book-keeping in every department. Each room, when it receives stock in any stage of advancement, credits the department from which it is received, and has the same charged to its account. The goods, when delivered into other hands, must with the waste correspond in weight to what was originally received, minus a small percentage which, adhering to the floors and walls of the room, can not be recovered. The result of all this is two-fold. First, it enables the company to transact its business intelligently, thus avoiding the too common fault of manufacturers—namely, ignorance of important defects until too late to remedy them. Second, the system of tests and checks running through the entire routine of this establishment is such that any fault can be at once detected and traced to its proper source, and the blame thrown upon the person who has committed it. Orders are transmitted in writing to and filed as vouchers by the foreman of each department. An incident illustrative of the benefits of such systemization recently occurred. Some goods were found to be deficient in weight when single pieces were tested, although the aggregate weight was correct. An examination immediately took place, but the cause for a considerable time eluded pursuit. Experiments were instituted, and the error was found to have arisen in the following manner. Some reels having been constructed of the proper size, the edges of the bars had been left somewhat rough. The operative in charge, wishing to correct the fault, sandpapered them, thus slightly reducing the size. This was the sole cause of all the mischief. The reels were afterward protected by plates of polished brass, and the operative cautioned against taking any such liberties in the future. The importance of such a system in the manufacture of a substance so valuable as silk, is obvious.

Dyeing is the next step. Our space will not admit of a full description of this process It is the most critical of all, and although the Americans have been for some time able to compete with the French in all colors save black, the difficulties attending the production of the latter have been only overcome within the last two years. Now, as fine blacks are made here as can be found in any market. A piece of American black dress silk was shown to an expert in our presence, who avowed that it was fully equal in all respects to the French silk, and could be sold as such in France. An error generally prevails among buyers in regard to sewing silk. The basis of price in this as well as all other silk goods is weight. Silk loses a certain amount in cleansing, as we have shown, but in dyeing it may be increased in weight so as to more than cover the loss. Heavy silks can thus be sold cheaper than light ones, but the gain in weight is at the expense of length of the thread, while the added weight in dyeing does not increase its strength. The high priced sewing silks are, therefore, the cheapest, as greater length of thread of a given strength is obtained for the money than in the cheap silks.

The third floor of this mill is still vacant. It has been reserved as a weaving room for dress-goods; and it is hoped that a company may soon be organized to occupy this room in the manufacture of such fabrics, now that the interests of importers and manufacturers are rendered mutual by the increased cost of imported goods. Formerly, these interests were antagonistic. The result was an effort on the part of home manufacturers to make an article which could compete in price. The effort now is to compete in quality. A comparison of goods shows that the latter attempt has been successful; and domestic silks are now afforded at a less price than the French of equal grade.

The Dale Manufacturing Company confine themselves, as yet, to the production of cords, braids, bindings, sewing silks, etc.; but there are large inducements to commence upon broad goods, which they have already successfully produced in small quantities.

The fourth floor is occupied by looms and braiding machines The looms are of quite a primitive construction some having the Jaquard attachment, but all appearing large and cumbersome for the light and delicate textures formed upon them. We greatly mistake if Yankee ingenuity does not ere long replace these machines with lighter and more effective devices We learn that two important improvements are

already in progress. The braiding machines are peculiar in appearance and operation. The principle upon which they operate may be illustrated by the "*ladies' chain*" in a quadrille. A number of bobbins are fixed upon a horizontal circular platform. They are placed upon spindles, and by an ingenious mechanism are made to dance around each other and around the platform, at the same time whirling on their axes like nothing that we can conceive of but the figure in the quadrille alluded to. The threads are thus interwoven into beautiful and intricate textures.

In closing this article we wish to make some remarks upon what seem to us causes of failure in some attempts to manufacture silk in this country. We have already mentioned the difference in price of labor in Europe and America, and it will be seen that when labor is worth in France only one fifth as much as in the United States, and in England only one fourth as much, that without protection the Americans could not compete with them. The present tariff on pure manufactured silks is sixty per cent *ad valorem*; on mixed silks fifty per cent; on organzine thirty-five per cent, and on raw silk nothing. The conclusions from these facts are obvious; but there is another effect of protection that will not be so generally perceived. France and England manufacture for a foreign market; the United States manufacture for themselves. The French workman is forced to be content with his blouse and wooden *sabots*, the Englishman with his corduroys. This state of things is necessary that labor may be cheap. The system abroad depresses labor, our system elevates it. Here the producers are consumers also, and enjoy in large measure the comforts of the more affluent, including educational facilities which render them able to prepare their children for higher stations in life as such open to them. This is proved by the fact that in the city of New York at this time large numbers of wealthy and prominent men are the sons of hard-working and industrious mechanics, who have, by virtue of their talents and business energy, risen from the ranks, to honor and preferment.

A fruitful cause of failure has been in injudicious location. No one who has examined the subject can have failed to perceive that peculiar manufactures tend to centralization, and in all industries requiring such intelligence as is necessary to conduct the manufacture of silk, this is the natural law. Those who ignore it must eventually suffer from its violation. We might adduce instance upon instance to illustrate this point but it will not be necessary. The names of Lyons in France, Birmingham and Sheffield in England, will suggest many others to the minds of our readers. The attempt to distribute this growing branch of industry rather than to concentrate it around the nuclei already established, must in our opinion prove disastrous. Add to the protection offered by the Government, the mechanical genius of the American mind, and a recognition of the laws of industry, and the permanent establishment of the silk manufacture in this country will be placed beyond question.

LITERATURE FOR WORKINGMEN.

A Baltimore journal, devoted largely to a very light species of literature, puts forth a plea for the more extensive circulation of that class of reading among the working classes This is quite natural. Interest is too often an obstacle to correct opinion. We were not, however, prepared to see such literature put at the head of all others, as being the precise thing that the masses need to supply their mental and moral necessities, as is done in the following quotation:

"The putting into the hands of the workingman imaginative literature is even a more important advantage than the cheapening of scientific books. The tendency of mechanical employments is to exercise the understanding alone; they afford no diet for the fancy or the feelings. They leave unfed no small portion of the intellect. They do not enlarge the world of observation or experience. They do not open any of the doors of history or biography. The artisan, like the student, requires the hours of leisure to stand in contrast with his daily employment. A few will find recreation even in severer studies, and will resort to it by a natural instinct; but we speak of the many who are used to be led rather than the few who can guide themselves. And, for the many, narrative, sometimes historical, but more frequently imaginative, holds out greater attractions than all the publications of the Useful Knowledge Society, or than all the excellent manuals of more recent date of mathematics, chemistry, or natural history."

The paper from which this is taken is a large and popular journal, and it is doing a great injury to the public by such false instruction.

It is a tissue of unfounded, and as such, uncalled for assertion from beginning to end. The tendency of mechanical employments is not alone to the exercise of the understanding. Granted that there are many occupations that require little or understanding or fancy, or anything else but elbow-grease (sawing wood for instance, which is a mechanical employment), we assert that there are no employments except the fine arts and authorship in which fancy has greater scope, and none whatever that call into more active play all the mental faculties than mechanical occupations. They do not leave the intellect unfed any more than other work, and if they did, we fail to see why imaginative literature is the proper food for famished minds.

Let us go down to the very root of this matter. All the useful arts are devoted to the supply of the wants of man. The first of these is air; that nature supplies. The second is food. Agriculture is then the first and most essential of all occupations, and as such it employs the largest number of individuals. Is there no scope for fancy and feeling here? Is all appreciation of the beauty of fruits and flowers, and billowy meadows, and ripening grain, confined to poets, painters, and novelists? What say you, country lads and lasses?

After food, clothing. Is there no room for play of fancy here? From whence have originated the beautiful textures, the designs for jewelry, the general taste which pervades the civilized world for refinements of dress?

But perhaps we shall find the field narrowed when we come to dwellings? No. Architecture attained, long ago, the dignity of a fine art.

How is it about those who make the machines, the implements by the use of which mankind are fed, and clothed, and housed? Here we are on our own ground, and we know of what we speak. First, the motors. A steam engine, or a turbine wheel. Did ever Raphael paint, or Grecian sculptor carve a form of greater beauty than a first class steam engine? Talk of the poetry of motion. The motion of the steam engine, and its influence upon the progress of civilization, is a grander epic than ever yet was written. We grant you that a turbine wheel has more mathematics in its compact framework than artistic taste, yet even in this triumph of hydraulic science, we may find curves upon which the eye can pleasurably linger. Pass from the motors to the lathes, the planes, the spinning jennies, the looms, the steam fire-engines; the carriages, railway cars, steamboats, and all the other paraphernalia of civilized life, and then say if you will that fancy is excluded from the mechanic arts. Every artizan is insulted by such a statement, and still further insulted by the statement that his mind can digest only the light and trashy imaginative literature which forms the staple of the paper that thus puffs its wares.

We do not believe in the entire exclusion of all the lighter kinds of literature; but we denounce such willingness to pander to a depraved taste as is manifested in the quotation we have cited. The silly love stories or the wonder-exciting tales of bloodshed, and crime, and narrow escape, with a spice of ghost stories thrown in for a relish, which abounds in many publications,—the most vapid, most diluted broth of literature is something we protest against as mental pabulum for any class of people whatever, especially for those young and intelligent mechanics and apprentices who weekly read the SCIENTIFIC AMERICAN.

WEATHER PROPHESYING.

That science will yet ascertain a way of foretelling storms, we firmly believe. Indeed, the telegraph is even now usefully employed for this purpose, and its agency, we hope, will at some not distant date serve to warn our coast dwellers and coastwise crafts of an approaching storm in time to enable the one to prepare to assist the other. Since the publication of Prof. Espy's Theory of Storms, much attention has been devoted to this subject, and although a system which is entirely reliable and generally applicable, has not yet been perfected, it is to be hoped that the progress of scientific investigation will yet evolve such a system.

The weather prophesying, however, of experts, who calculate by the phases of the moon, by the comparison of one season with another, by cycles of storms, by the variations of the barometer, and the fluctuations of the thermometer, we deem of no value whatever. Nothing has ever yet been adduced to prove that the moon has any appreciable influence over the climate of this planet, or the temporary changes in the climate of localities. The comparison of former years with the present afford no criterion. The changes on the surface of the inhabited earth, by the destruction of forests and the multiplication of civilized habitations have much to do with alterations of climate. The theories of storm cycles are yet in embryo. Sudden fluctuations from causes beyond our knowledge are not taken into account by storm theorists; or if so, these fluctuations upset all their calculations, and they are left in the dark. The variations, neither of the barometer or the thermometer, are to be confided in. They are unreliable.

The astronomer, who from the top of his tower, or from a mountain summit; or the sailor, who has a more extended field of vision, may, from the appearance of the clouds and the condition of the atmosphere, prognosticate the advent of a storm and its direction. So, also, the farmer and the hunter, by long experience, necessitated by their pursuits, learn to read the heavens, or, rather, the atmosphere, to some benefit; but when our weather prophets presume to foretell a dry summer, a lean harvest, a cold winter, from their yearly observations, based only on observation, and not on a thorough knowledge of natural laws, we choose to place but little reliance on their prognostications.

Hardening the Moldboard of Plows.

A new method has been discovered for the manufacture of the moldboard of plows, which gives them all the hardness and temper of steel, in combination with the toughness of iron. The moldboard (good iron) is heated and dipped into molten iron. It remains there ten seconds, when the two surfaces become heated to a white heat, while the center is not heated through. It is then immediately dipped into water; the surfaces come out harder than the highest tempered steel, while the interior is still iron and retains all the toughness and strength of the iron. The advantages claimed for this invention is that the plows made by this process will take the finest and hardest polish, while they will be tough enough to endure any reasonable knocking about in stony soils.

We find the above in one of our exchanges. What is the new method? and where are such plows manufactured? We have had several inquiries about this matter.

A MAN in England recently made fifteen miles in one hour on a velocipede.

OFFICIAL REPORT OF PATENTS AND CLAIMS

Issued by the United States Patent Office.

FOR THE WEEK ENDING OCTOBER 13, 1868.

Reported Officially for the Scientific American.

PATENTS ARE GRANTED FOR SEVENTEEN YEARS, the following being a schedule of fees:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Reissue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay $500 on application.

☞ *Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to Inventors, may be had gratis by addressing MUNN & CO., Publishers of the Scientific American, New York.*

82,913.—EEL POT.—George D. Allen, New York city.

I claim the eel pot funnel, of india rubber, and perforated substantially as above set forth.

Also, the eel pot funnel, formed of india rubber, with a contracted mouth, substantially as before set forth.

Also, the combination of the eel pot funnel, with needles pointing toward its neck, substantially as before set forth.

Also, the eel pot funnel, having the two characteristics of perforation and a contracted mouth substantially as before set forth.

Also, the combination of the body of the trap with a funnel of india rubber, substantially as before set forth.

8 ,914.—ALKALI CAN.—Christian Barry, Philadelphia, Pa.

I claim an alkali can, in which clay is used for producing a tight joint, substantially in the manner described.

82,915.—CORN HUSKING PIN.—Elias Blair, Bucyrus, Ohio.

I claim an instrument for husking corn, constructed substantially in the manner shown and described.

82 916.—PEN RACK.—Charles J. Bouche, Louisville, Ky.

I claim a pen rack, composed of the sides, A B C D, connected by hinge joints, as shown, the hinged roof, H I, brace, F, and racks, M, all constructed and arranged substantially as described, and provided with calendars, O P Q, and lips, S, for the reception of cards, substantially as set forth.

82,917.—CENTERING SQUARE.—George W. Brooks, Clinton, Mass.

I claim, in combination with the square, the adjustable slotted bar, b, when constructed as and for the purpose substantially as described.

82,918.—CORN PLANTER.—John A. Burchard, Beloit, Wis.

I claim, 1st, Broadly, the employment of the dropping device, D, when constructed and arranged substantially as herein described and for the purpose set forth, and used for the purpose of enabling the operator to know by ocular demonstration whether the machine is dropping the seed with certainty and accuracy.

2d, In combination with the device, D, the pawl, K, and stop latches, g and l, when used for the purpose herein set forth.

3d, The combination and arrangement of the several parts of the planter herein described, when used for the purpose set forth.

82,919.—HOLLOW WINDOW CROSS BAR OF SHEET IRON.—T A. Cambensy, Chicago, Ill.

I claim, as a new article of manufacture, the hollow sheet metal window bars, constructed substantially as shown and described.

82,920.—BLIND HINGE.—Charles B Clark, Buffalo, N. Y.

I claim forming the cylindrical plate, a, with the depressed slot, b, and the circular eye, c, with outside catch, d, the whole combined and arranged as described, and operating in the manner and for the purpose specified.

82,921.—METALLIC COUNTER BRACE.—John L. Cooper, Preston, Conn., assignor to himself and Joshua E. Fellows.

I claim the new article of manufacture of a spur socket, in combination with a counter brace, when made and applied substantially as herein described.

82,922.—OX YOKE.—William Cooper, Paris, Me.

I claim the sliding slotted plate, a, held by staples, b b', and adjusting nuts, c c', and carrying the shaft ring, f, as and for the purpose set forth.

82,923.—HARROW.—Andrew J. Craig, Ashmore Station, Ill.

I claim the bent teeth, A A, pivoted together as described, so as to form a harrow with flexible sides, substantially as and for the purposes herein set forth.

82,924.—WASHING MACHINE.—C. H. Cramer, Rutland, N Y.

I claim the combination of the adjustable frame, B, and the treadle, I, for raising the same and the screws, H, for regulating its pressure, substantially in the manner and for the purpose described.

82,925.—HYDROCARBON BURNER.—Sutton Edward Crow, Stratford, England. Patented in England, June 14, 1867.

I claim the arranging the apparatus in such manner that a jet or jets of steam, under pressure, or, it may be of air, issues into the furnace in a direction parallel, or nearly parallel, to a pipe or passage by which combustible liquid is led into the furnace, such jet being immediately in rear and below the mouth of such pipe or passage, substantially as described.

82,926.—MORTISING MACHINE.—Franklin A. Deland, and Luke Phillips, Memphis, Mich.

We claim, 1st, The combination of the vertical guide, C', bed, C, slotted lever, D', and pin, E', substantially as and for the purposes herein set forth.

2d, The independent perforated guide plate, C, in combination with the jaw guide, N, and vertical bar, E, when constructed, arranged, and operating, substantially as and for the purpose herein set forth.

82,927.—ATTACHING ROSETTES TO HARNESS.—William L. Denio (assignor to himself and Irwin Davis), Rochester, N. Y.

I claim the rosette, A, provided with the screw socket or nut, b, in combination with the screw loop, B, and attaching straps, g h, the whole arranged as described, and operating in the manner and for the purpose specified.

82,928.—PIANOFORTE BRIDGE.—Charles H. De Vine, Buffalo, N. Y., assignor to De Vine Brothers.

I claim the curved bridge, A, composed of veneers, a a a, and b, having the ivory or equivalent top plate, F, attached, as herein described.

82,929. APPARATUS FOR SETTING AXLES TO WAGONS.—David Ducharne, Mechanicsville, N. Y.

I claim 1st, The hook or jack, B C, and the upright fulcra or studs, E and E', in combination with the horizontal cross bar, F, each being constructed and operated substantially in the manner and for the purposes herein described and set forth.

2d, The triangular shaped guide, H, in combination with the jack, B, studs, E and E', and cross bar, F, substantially in the manner and for the purposes herein described and set forth.

82,930. MOUNTING SPECTACLE AND EYE-GLASSES.—Charles N. Dunham, Philadelphia, Pa

I claim the glasses, A A, having the pieces, B B, D D, cemented to them, as a new article of manufacture.

82,931.—CORE BAR FOR CASTING PIPES.—John Enright (assignor to himself, William Wall, and Thomas Enright), Louisville Ky.

I claim the collapsable metallic core rod or cylinder, having four longitudinal segments, A, so constructed and arranged as to be operated independently of each other, as herein shown and described.

82,932.—STUMP EXTRACTOR.—R. B. Ferris, Holland, Mich.

We claim the combination of the lever, H, sheave, F, chain, I, rope, J, sheave blocks, 3 and 4, sills, A, post, B, tie beams, C, standards D, pulley, E, and halyard, K, when constructed, arranged, and operating substantially as described and for the purposes set forth.

82,933.—ADJUSTABLE SQUARE AND BEVEL.—E. B. Foster and John G. Witt, Elmira, N. Y.

I claim the combination with a try or T-square, of the wings, D D, and the screw, F, for adjusting the angle of the same, substantially as described.

82,934.—PLOW.—Andrew Friberg, Moline, Ill.

I claim the plate, C, constructed and applied between the landside, A, and the handle, B, of a plow, substantially as described.

82,935.—RATCHET-AND-PAWL MECHANISM.—Joel Garfield, Groton, Mass.

I claim in combination with a ratchet wheel and pawl arranged substantially as shown and described, the loose collar or disk, b, having an inclined slot, into which the pawl pin projects, rotation of the pawl plate in one direction forcing the pawl up into engagement with the ratchet teeth, and its rotation in the opposite direction carrying it out of engagement therewith, substantially as set forth

Also, in combination with the ratchet wheel and pawl and the loose collar, the stud, l, and adjustable screw or pin, n, operating substantially as shown and described.

82,936.—STEAM ENGINE PISTON VALVE.—Richard Gornall, Baltimore, Md.

I claim, 1st, The combination of the main valve, C, with the interior sliding valve, D, having the flanges, e e, substantially as and for the purposes specified.

2d, In combination with the valve, C, and the interior sliding valve, D, the auxiliary steam ports, n n', substantially as and for the purpose specified.

82,937.—RAILWAY FROG.—Josiah Gray, Chicago, Ill.

I claim, 1st, The shield, H, constructed substantially as described, in combination with the point, C, and guards bars, B, as and for the purposes set forth.

2d, The combination of the chairs, E, bars, F, guard bars, B, shield, H, and point, C, all operating substantially as set forth and shown.

82,938.—CULTIVATOR PLOW.—B. F. Guy and J. V. Guy, Macomb, Mich.

We claim, 1st, In combination with plows thus hung in a frame, the spring bars and connecting chains or cords, as and for the purpose set forth.

2d, In combination with the plows, their bifurcated rods, and spring bars, the shoes, e e, substantially as and for the purpose set forth.

3d. In combination with spring bars, and plows of described cultivator, the rack, l, with its handle, l', as and for the purpose described.
4th. The cultivator plow when constructed of the several parts, all arranged to operate substantially as and for the purposes set forth.

82,939.—BUTTER TUB.—Earl Guyer, Wolcott, Vt.

I claim the combination of the butter tub, A, cover, B, keys, C C, cross bar D, and bent metal bars, E E, or their equivalents, substantially as and for the purposes herein set forth.

82,940.—ANCHOR.—J. W. Habberley, South Malden, Mass.

I claim an anchor when constructed of the shank, A, of wrought iron, inserted into the cast hub, B, which latter is provided with sockets for the reception of the square inner ends of the flukes, D, which are secured by pins or keys, substantially as described.

82,941.—DEVICE FOR CHANGING THE SPEED OF MACHINERY.—Thos. C. Hargrave, Boston, Mass., assignor to himself, Wm. B. Charlton, and H. K. Moore.

I claim the pulleys, B C, secured to independent shafts, d L, revolving one within the other, and connected by means of gears, I K and g M, to the driving shaft of the machine, the pulley, A, and belt shipper, E, by means of which the rate of speed may be expeditiously changed, the whole combined and arranged substantially as described.

82,942.—COMBINED HARROW AND CULTIVATOR.—David M. Harkrader, Chill, Ill.

I claim, 1st, The knives or cutters, Q Q, combined with the frame pieces, B C D and E, and the shovels, P P, teeth, O O, handles, K K, cross pieces, R R, bows, S S", and hitching device, T T U, constructed and arranged as described and for the purpose set forth.

2d, The combination of the frame, A F, substantially as described, with the frame, B C D and E, constructed and arranged as described and for the purpose set forth.

82,943.—SAW HANDLE.—Wm. T. Harvey, Jr. (assignor to himself and Peter Grimes), Philadelphia, Pa.

I claim the combination of the handle, A, metallic plate, M', with lug, L, for fitting into the notch, N, plates, M M, pin, P, confined by screws, S S, for retaining a saw blade, the whole constructed to operate in the manner and for the purpose set forth and described.

82,944.—ELASTIC GORING FOR BOOTS AND SHOES.—John Haskin, Boston, Mass.

I claim as a new article of manufacture a goring for boots and shoes, made of perforated rubber sheets, with stays, B B, saturated with an elastic varnish, as and for the purposes described and specified.

82,945.—HEATING STOVE AND FIRE PLACE.—A. J. Haswell, Circleville, Ohio. Antedated Oct. 6, 1868.

I claim, 1st, The division plate, b, applied in connection with the stove, A, in the rear of the fire plate, a, to produce the passages, h and i, in the manner and for the purpose explained.

2d, The division plate, b, provided with the tubes, b' b", and the orifices, d, substantially as described.

82,946.—BOOT AND SHOE BOTTOMING.—Cyrus Hay, Stoneham, Mass.

I claim a shoe "bottoming" made substantially as described and for the purpose set forth.

82,947.—CHURN DASHER.—Martin Heliker and Orsamus A. White (assignors to themselves and J. W. Bostwick), Norwalk, Ohio.

We claim the concentric circles or coils of wire, C, as arranged in combination with the radial arms, B, for the purpose specified.

82,948.—HOT AIR FURNACE.—John I. Hess, Philadelphia, Pa. Antedated Sept. 25, 1868.

I claim, 1st, The combination and arrangement of bed plate, B P, fire chamber, F G, heating drums, H D and H D', and C D and C D', with their spirals, connecting pipes, P P1 P2 P3 P4 P5 P6 and P7, turn table composed of parts, L P and T P, water box, W B, for the purpose specified.

2d, The application of the within described turn table to stoves or other heating apparatus, for the purpose specified.

82,949.—COMPARTMENT CANE.—L. C. Heylin, Philadelphia, Pa.

I claim a cane arranged as herein described, whereby one portion thereof is adapted to be used as a pipe, the handle of which is contained in a compartment formed in the same, and other portions of the body of the cane being provided with receptacles for cigars, tobacco, and matches, the whole constructed as herein described.

82,950.—POTATO WASHER.—D. K. Hickok, Morrisville, Vt. Antedated Sept. 30, 1868.

I claim the arrangement of the arm, D, and shaft, C, with the vessel, B, when provided with a lid and feet and perforations, as described, the several parts being constructed and used as and for the purpose herein set forth.

82,951.—LAST.—Benjamin Hitchings, Lynn, Mass.

I claim attaching the block of a last to the body of the same by means of a continuous dovetailed-formed bead, C' D', said bead being curved longitudinally, forming an arc of a circle, which fits into corresponding dovetailed groove, C D, formed in the body of the last, substantially as described and for the purpose set forth.

82,952.—SKATE.—Horace B. Hooker, Rochester, N. Y. Antedated Oct. 6, 1868.

I claim, 1st, A skate having a heel plate, H, with its flange, q, and spurs, d, in combination with the ball, D, and cam, r, all acting conjointly, as and for the purposes herein set forth.

2d, The tripod heel plate support, composed of the posts, F, as herein described.

3d, The adjustable toe plate, B, in combination with the self-adjusting clamp G, as and for the purposes shown.

82,953.—SKATE.—H. B. Hooker, Rochester, N. Y. Antedated Sept. 28, 1868.

I claim a skate having a heel plate, D, with its flange, a, and spurs, b, in combination with the adjustable clamp, G, and jam nut, C, all acting conjointly, as herein shown and for the purpose set forth.

82,954.—GIG SADDLE.—John Hughes, Newark, N. J. Antedated Oct. 3, 1868.

I claim, 1st, The seat, A, with the recesses, B and B, the piece, C, and back piece, E.

2d, The crupper loop, F, arranged with the recess, and piece of leather, I.

3d, The plate, L, with the pins, M, or their equivalents, in combination with the frame, G.

4th, The construction of the jockey, P, by incasing the extra plate, L, and fitting the upper end of the jockey to the shape of the seat, A, substantially as and for the purpose specified.

5th, The whole in combination substantially as and for the purposes specified.

82,955.—FOLDING CAMP STOOL.—James Ingram, Troy, N. Y.

I claim the arms, D D', legs, E E', hinged to the center piece, A, and the springs, F F', each and all being constructed, arranged, combined, and operated as a whole, in the manner and for the purposes substantially as herein described and set forth.

82,956.—EXPANSIVE BIT FOR WOOD BORING.—W. A. Ives, New Haven, Conn.

I claim the mode of holding in place the adjustable cutter, C, by its upper edge, by means of the groove, B, the wedging screw, a, and slot, b, in the cutter, C, and set screw, d, constructed and arranged substantially in the manner as above specified.

Also, the adjustable cutter, when constructed in such a manner as that all the wood is removed without the necessity of the ordinary fixed central cutters upon the stock, substantially as set forth.

82,957.—HOLLOW AUGER.—W. A. Ives, New Haven, Conn.

I claim the combination of the circular stock, A, slot, B, and screw, E, and two movable jaws or knife holders, C C, constructed and operated substantially for the purposes and manner as above specified.

82,958.—FLOUR DISPENSER.—Daniel L. Johnson, Yorkville, Mich.

I claim the construction and arrangement of the hopper, A, tube, B, and vertically adjustable spindle, D, having disk, F, and wing, w, attached thereto, with the casing, C, and guard, L, all combined and operated substantially in the manner and for the purposes set forth.

82,959.—PLOW.—G. W. Keeler, New Haven, Ohio.

I claim, 1st, The wings, F, when hinged to the plate, D, and standard, B, so as to allow of their being constructed or expanded in the manner as and for the purpose specified.

2d, The plate, I, as arranged in combination with the plate, D, and wings, F, for the purpose set forth.

82,960.—SPRING-BED BOTTOM.—J. B. Kelley and N. P. Kingsley, Brandon, Vt.

We claim, 1st, The combination and arrangement of the springs, c' c", blocks B B, and clamp screw, s, substantially as and for the purposes set forth.

2d, The arrangement and combination of the springs, c' c", blocks, B B, and clamp screw, s, with the spring, c, blocks, b b, and slats, a a a, substantially as and for the purposes set forth.

82,961.—HARNESS-SADDLE TREE.—Jacob F. Knoor, Orange, N. J., assignor to Frank K. Hipple, Philadelphia, Pa. Antedated Oct. 3, 1868.

I claim, 1st, A loop or bridge spanning the avenue through which the back band, crupper loop, and saddle-hook pass, substantially as described and for the purpose set forth.

2d, The affixing the burrs or nuts of the terrets to the back pad, and conveying it beneath the bridge, to receive the screw end of the terrets, substantially as described, and for the purpose set forth.

82,962.—WRENCH.—E. J. Leyburn, Lexington, Va.

I claim, 1st, The arrangement of the arms, E E, and jaws, F F, in relation to the unbroken ratchet (which ratchet is capable of being turned through a complete circle), so that said jaws are adjustable for large and small nuts, within the capacity of the wrench, without a corresponding enlargement of the ratchet wheel being necessary, substantially as described.

2d, The combination of the pivoted right-and-left pawl, a a, with the arms, E E, and adjustable jaws, F F, substantially as and for the purpose described.

3d, The jaw-holding portion, D1 E E, hub, D2, ratchet wheel, D, adjustable jaws, F F, handle, A, and pawl, C, a a, all combined and arranged substantially as described.

82,963.—AGRICULTURAL LOCOMOTIVE WITH SPADING APPARATUS.—Conrad Locher, Oroville, Cal.

I claim, 1st, The application of equalizing gears between the axles of a wagon, so, in turning a curve, each wheel adopts the speed which the curve requires, and receives its propelling motion from the engines by means of gearing, or their equivalent.

2d, The gearing and connection through the kingbolts.

3d, The spaders, so constructed that they enter the soil like a pick, (nearly vertical), cut off a slice like a spade, and turn it over like a plow.

4th, Turning the spaders in the same direction as the wagon, thereby assisting locomotion.

5th, The combination of the whole, in the way and manner herein set forth.

82,964.—APPARATUS FOR PRODUCING RECIPROCATING MOTION.—J. J. P. Lyon, Ypsilanti, Mich.

I claim the wheel, A, support, B, lever, C, connecting rods, D, and counterpoise weight, F, when used in connection with pump rods, E, and weights, G, and operating substantially as and for the purposes herein described.

82,965.—GRATE BAR.—William S. Mackintosh, Allegheny City, Pa.

I claim the grate bars having a broad upper face with sides tapering downward, when made hollow, for the passage of water through them, substantially as and for the purpose hereinbefore described.

82,966.—CAR COUPLING.—S. Madden, Eureka South, Cal.

I claim the above-described combination and arrangement of devices to form an automatic car coupling, consisting of the sliding bumper, E, with the slots, G and G', opening, J, and spring, F, the pin, I, with collars, H and H', and the guiding plate, K, with or without the rollers, D, at the end of the link, substantially as specified.

82,967.—WATER LEVEL DETECTOR FOR BOILERS.—John Maslin and David Birdsall, Jersey City, N. J.

I claim the combination with the stem or plug, D, of the cam, K, disk, L, the valve, d, of the whistle with its stem and the spring, f, as described.

82,968.—BUOYANT PROPELLER.—Elisha Matteson, Brooklyn, N. Y.

I claim the cylinder, A, air tight and provided with independent air tight V-shaped buckets, C, arranged on the exterior of said cylinder, and within a suitable frame, B, to operate substantially as set forth.

82,969.—GAGE.—Lafayette H. Mayott, Springfield, Mass.

I claim the construction and arrangement of the graduated beam, A, having a thread cut thereon, in combination with the sliding arm, B, and nut, C, engaging therewith, set screw and stationary arm, the whole constituting an adjustable side gage, substantially as described.

82,970.—SAW MILL.—Alex. McCreight, Tranquility, Ohio.

I claim, 1st, The ratchet bars, g g, ratchet wheels, h h, and bar, K, when combined with the fixed frame, b b b' b', moving frame, d d d' d', and operated substantially as described.

2d, The shaft, C, of the described mill, in combination with the shafts, H and H', with their connections of gearing upon the shaft, C, and bearings in the levers, m m', and connecting bands with roller, M, all as and for the objects described.

82,971.—MACHINE FOR CUTTING SOAP.—Peter B. McKelvey, Albany, N. Y.

I claim, 1st, The carriage, I, constructed and operated substantially as hereinbefore specified and set forth.

2d, The said carriage, when combined with stationary wires, in the manner and for the purposes above described and set forth.

3d, The combination of the stationary wires with the notched plates, B and C, the screws, G, and nut, F, substantially in the manner and for the purposes hereinbefore specified and set forth.

82,972.—HORSE RAKE.—G. M. L. McMillen, Dayton, Ohio.

I claim, 1st, The adjustable fastening for the rake teeth, consisting essentially of the lugs, D and G, and screw bolt and nut, H, the lugs being constructed with the flanges and arms as described, and the whole operating together in the manner and for the purpose set forth.

2d, The guide standards, J J, when constructed with the head, j, and the slot, i, extending about half way from the spring bar to the head, j, and when made adjustable in relation to the spring bar by means of the screw thread and nut, or any equivalent device, and operating in connection with the spring, K, and the rake teeth, substantially as described.

82,973.—BOLT HEAD.—Franklin S. Miles, Philadelphia, Pa.

I claim, as a new article of manufacture, a bolt head, constructed as above described.

82,974.—LOW WATER INDICATOR.—William Moore, Kokomo, Ind.

I claim the combination and arrangement of the chamber, A, index lever and scale, with the water regulator, all for the purposes and substantially as herein described and set forth.

82,975.—MATTRESS.—Albert G. Morey, Chicago, Ill. Antedated September 30, 1868.

I claim, 1st, A mattress or cushion composed of alternate layers of elastic sponge and some semi-elastic material, substantially in the manner and for the purpose set forth.

2d, Supporting one or more layers of elastic sponge with some less elastic substance in the construction of mattresses or cushions, substantially in the manner and for the purposes described.

82,976.—COFFEE AND TEA STEAMER.—Charles G. Murch, Chicago, Ill.

I claim, in a coffee or tea apparatus, the inner vessels, A A G, with the stop cocks and the upper vessels, B B, pipes, E, and strainer, C, the whole combined and arranged substantially as and for the purposes shown.

82,977.—RAILWAY FROG.—William H. Nobles, St. Paul, Minn. Antedated October 10, 1868.

I claim a railway frog, when constructed with the rails, B B, with their flange grooves and facings, C C, all arranged as described and for the purposes set forth.

82,978.—CAR WHEEL.—William H. Nobles, St. Paul, Minn. Antedated October 10, 1868.

I claim the construction of the wheel, A, with two flanges, B B, and three treads, C C C, as shown and described, and for the purposes set forth.

82,979.—HORSE HAY FORK.—J. K. O'Neil, Kingston, N. Y.

I claim the two levers, A B, with their beaks, a b, and spring detent, c, connected and operating in combination with the prongs, G G, of the fork, substantially as and for the purpose herein specified.

82,980.—BLIND SHUTTER FASTENING.—Oscar Paddock, Watertown, N. Y.

I claim, 1st, A device for opening or closing and fastening blind slats, composed of the herein described toothed segment, and endless screw for operating the same, the said parts being applied to the blind slats or shutter or blind frame, respectively, and combined for operation in the manner shown and described.

2d, The combination with the hollow plunger, or sliding rod and set screw, or equivalent device, upon the same, of an auxiliary adjustable rod, supported in said plunger, and provided with a follower, for engaging with the blind slat fastener, substantially as described, for the purposes shown and specified.

82,981.—VOLTAIC BATTERY.—Henry Palmer, Evanston, Ill.

I claim the combination of the plates, B, and the positive and negative elements, when arranged to operate in the manner and for the purposes specified.

82,982.—APPARATUS FOR DYEING HAIR.—William Patton, Springfield, Mass.

I claim, in combination with a comb, H, or other suitable device for applying them to the hair, beard, or moustache, simultaneously, for the purpose of coloring either, alternate coats of nitrate of silver and gallic acid, conveyed and attached to such comb, or other device, by means of suitable vehicle, such as gum-arabic, gum-tragicum, caoutchouc, substantially in the manner herein described.

The combination of the nitrate of silver with the gum-arabic, or other suitable gelatinous vehicle for the purpose, prepared and applied substantially in the manner described.

The arrangement of the comb, H, with two rows of opposite teeth, one row prepared with nitrate of silver and the other with gallic acid, in the manner described.

82,983.—MANUFACTURE OF GLASSWARE.—John P. Pears, Birmingham, Pa.

I claim a mold for making footed or footed and stemmed glassware, whereof that part in which the body, stem, and foot are formed is in a single piece, without part or division, in combination with the bottom plate having a projecting core, substantially as and for the purpose described.

82,984.—MERIDIAN TIME INDICATOR.—Edward Prevear, Leominster, Mass.

I claim the meridian arm, g, fitted to swing, in combination with the lens, i, and index, k, substantially as specified.

82,985.—CLAMP.—Elijah K. Purdy, Schoolcraft, Mich.

I claim, 1st, The floor clamp, consisting of the clamps, A, hinged together at B, and provided with prongs, C, the curved lever, D, and slotted lever, E, with holes, F, all constructed and arranged substantially as and for the purposes set forth.

2d, In combination with the above, the brace, A, provided at its lower end with a scarp serrated edge and hole, I substantially as and for the purpose described.

82,986.—CLAMP FOR SADDLERS, ETC.—William K. Rairigh, Rural Valley, Penn.

I claim the shaft, B, with its ratchet, D, the chamber, C, pawl, e, and spring, g, when arranged upon and made to operate the jaws of a clamp, substantially as and for the purposes specified.

82,987.—HARVESTER.—Amos Rank and Joshua H. Cox, Salem, Ohio.

We claim, 1st, The combination, substantially as set forth, in a two wheeled hinge joint harvester, of an overhung reel, adjustable vertically on a single post mounted on the shoe, with a driving shaft mounted on the reel post, and carrying a sliding pinion, for the purposes specified.

2d, The combination, as set forth, with the reel and reel post, of the clasp, I, bracket, i i, pinion, m, wheel, M, and driving shaft, L', whereby the reel can be raised or lowered without deranging the gearing.

3d, The combination, substantially as set forth, of the reel shaft and its driving shaft, with tangentially toothed gearing, for the purpose specified.

82,988.—CLASP FOR TRUNKS, ETC.—Louis Ransom (assignor by mesne assignment, to Louis Ransom and Eugene Hyatt), Lansingourg, N. Y.

I claim a trunk clasp, consisting of the two parts, A and B, the clasp tongue, c, and spring, d, constructed, combined, and operating substantially as described.

82,989.—GRAIN SEPARATOR.—P. N. Recker and Jos. Recker, Dayton, Ohio.

We claim, 1st, The triangular shaped horizontal bars, m m, and perpendicular bars, n n, constructed as described, and forming a frame, to be covered with wire netting, for the purpose of scouring grain, substantially as and for the purposes herein set forth.

2d, The wire netting, N, when constructed in sections, or otherwise, of square wire, and used substantially as and for the purposes herein set forth.

3d, The arrangement of the valve, a, rod, b, slotted bar, c, and screw, d, for the purpose of regulating the discharge of grain out of a tube, substantially as and for the purposes herein set forth.

4th, The arrangement of the chamber, D, with valve, e, and valve, g, covering the entrance to the chamber, G, constructed as described, and operating substantially as and for the purposes herein set forth.

5th, The arrangement of the hopper, H, passage, I, and valve, h, constructed as described, and operating substantially as and for the purposes herein set forth.

6th, The arrangement of the passage, Q, chamber, R, with its valve, w, and the valve, y, covering the entrance to the chamber, S, constructed as described, and operating substantially as and for the purposes herein set forth.

7th, The arrangement of the chambers, C D G Q R and S, passage, I, and the hopper, H, carrying the different currents of air through the chamber, E, and into the drum, F, substantially as and for the purposes herein set forth.

82,990.—PLOW.—Francis Reese, Elyton, Ala.

I claim the guide plate, and the combination of the scraper, hilling-plow, and other parts, as described.

82,991.—HARVESTER RAKE.—Thaddeus S. Reeve and Chas. D. Smith (assignor to themselves and Wm. Schwartz), Chicago, Ill.

We claim, 1st, The adjustable plate, C, in combination with the standard, D, sleeve, J, and lever, H, for supporting the reel, as fully set forth and shown.

2d, The boxed sleve, J, oscillating on the standard, D, in combination with the adjustable lever, H, pin, A", or its equivalent, and slotted standard, F, substantially as set forth.

3d, The sliding section of the reel, M, slide, N, and lever, G, as fully set forth and shown.

82,992.—BABY JUMPER.—Charles Rich (assignor to Sarah A. Rich), Poughkeepsie, N. Y.

I claim, 1st, The rocking yoke, C, pivoted to the base, A, supporting the seat bar, D, and connected with the up and down adjustable spring, E, all made, arranged, and operating substantially as herein shown and described.

2d, The post, B, which carries the spring, E, when arranged in combination with the base, A, yoke, C, and seat bar, D, all made and operating substantially as herein shown and described.

3d, The bow shaped swinging railing, F, when attached to a standard, f, which is pivoted to the under side of the seat, and when fastened with its ends to the fixed horn, d e, substantially as and for the purpose herein shown and described.

4th, The projecting lugs, h, and the pin, l, in combination with the swinging standard, f, and rail, F, for locking the same, substantially as set forth.

5th, A baby jumper, consisting of the base, A, post, B, swinging yoke, C, spring, E, seat bar, D, saddle, G, horn, d e, and swinging rail, F, all made, arranged, and operating substantially as herein shown and described.

6th, The sliding foot rest, H, in combination with the wedge, j, and seat bar D, of a baby jumper, substantially as and for the purpose herein shown and described.

82,993.—PUNCHING MACHINE.—W. T. Richards, Bridgeport, Conn.

I claim the arrangement, herein described, of the gage levers, k and l, slotted plate, H, lever, I, and the punch stock or gate, C, as and for the purposes set forth.

82,994.—WRENCH.—Edwin P. Russell, Manlius, N. Y.

I claim the jaw, C, when operated upon the tongue, c, by means of the lever, B, the pin, p', and the slot, s.

82,995.—STANCHION FOR FASTENING CATTLE.—Larkin S. Safford, Hope, Me.

I claim, 1st, The manner of hanging the pieces, D E, loosely in the top piece, A.

2d, The yoke, L.

3d, The combination of the link, T, the yoke, L, the pieces, D E, and the top piece, A, substantially as and for the purpose set forth.

82,996.—GRAPE TRELLIS.—Abisha Scofield, Starkey, N. Y.

I claim, in combination, the post, A, socket, B, set screw, G, standard, C, arms, F F', and bars, D, arranged as and for the purpose set forth.

82,997.—TUMBLER WASHER.—M. Scrannage, Boston, Mass.

I claim, 1st, The swivel, K H H H, on the stem, E, arranged and operating as described, and for the purpose set forth.

2d, The rose, D, when provided with tangentially discharging orifices, d d', etc., operating in combination with the swivel, K H H H, arranged substantially as described, and for the purpose set forth.

82,998.—SWING.—George A. Seaver, New York city.

I claim the combination of the propelling rope or ropes with the movable handles or sliding sockets, substantially as described.

82,999.—WASHING MACHINE.—N. M. Shafer, New York city.

I claim the method of squeezing the suds through the clothes, by means of unresisting wire boxes, B and L, or their equivalent, in combination with the pump, H, E, and, D, as herein described and set forth.

83,000.—HORSE RAKE.—Geo. C. Shaler, Gilboa, and Harry Barlow, Herbert, N. Y.

We claim the platform, a, rigidly attached to the revolving axle, b, in which the curved teeth are fixed, and the platform, c, hung between the projections d d, of the axle tree, and carrying the clearers, e, as herein shown and described, whereby, as the driver steps from a to c, the latter is depressed, the axle partially turned, and the teeth and clearers operated as set forth and shown.

83,001.—Jacob J. Smith, Philadelphia, Pa. Antedated October 1, 1868.

I claim, 1st, An elastic bed bottom, consisting of a series of separate wooden slats, B B, arranged parallel with each other and with the side rails of the bedstead, and having a round knob, b', fixed near each end, in the middle of the width of the under side of each slat, B, and the said slats suspended by means of two single cords, C and C', which respectively pass in a strained or stretched manner from the knobs, b', of the slats to like knobs, a", fixed in the head and the foot rails, A A', in the zigzagged or laced manner shown and described, for the purpose specified.

2d, In combination with the mechanical devices claimed in the preceding clause, the winding apparatus, D, arranged to operate substantially as and for the purpose described.

83,002.—HORSE RAKE.—John B. Smith, Newton, assignor to himself, J. B. Stevens, and U. G. Stevens, Jasper county, Ill.

I claim the levers, D D, in connection with the slides, f f, and clutches, Dx, oblique arms, h, at the front ends of the levers, the crank ends, i, of shaft, Ex, and the projections on the slides, f, and thills, all arranged to operate in the manner substantially as and for the purpose specified.

83,003.—DUMPING WAGON.—George R. Sneath and C. H. Sneath, Wilmington, Del.

We claim, 1st, The combination, in a dumping wagon, of the box, A, hung on trunnions, with bed frame timbers, h h, cross bar, t, bent axle tree, s, all operating substantially as shown and described, and for the purpose set forth.

2d, The crank shaft, v', and hinged bolts, v v, arranged to operate as herein described, for the purpose specified.

3d, The bed frame of a dumping wagon, when composed of the parts, h h, t, i i i, u u, and j, arranged as herein described.

4th, The arrangement of the frame, i i o, with the fifth wheel, k, and springs m n n, substantially as described, when forming part of the running gear of a dumping wagon, substantially as herein described.

83,004.—TOY PISTOL.—Greenleaf Stackpole, New York city.

I claim a pistol or gun, having the spring trigger, E, and slot, A, in combination with the rubber band, B, and plunger, F, when the parts are constructed and operated substantially as set forth.

83,005.—WAGON AND CAR UNLOADER.—Noah Swickard, Galva, Ill.

I claim, 1st, The slotted platform, A, in combination with the pivoted balance bars, B B, board, C, end bars, I I, and stops, H H, all constructed and operating substantially as and for the purposes herein set forth.

2d, The pivoted balance bars, B B, provided with one or more self-acting dogs, G, in combination with the spring toggle keys, E E, and key, F, all constructed and operating substantially as and for the purposes herein set forth.

3d, The arrangement of the slotted platform, A, balance bars, B B, and lid, D, to the hopper, substantially for the purposes set forth.

83,006.—RAILWAY CAR BUMPER.—Joseph Tanney and John H. Brown, Bangor, Me.

We claim the rubber spring, D, when constructed as described, and inserted into the drawhead, C, substantially as and for the purposes herein set forth.

83,007.—HAY ELEVATOR.—Nelson C. Thomas and Jacob H. Coe, Brighton, Mich.

We claim the conveyer, H, when constructed as described, traveling on the rope, D, provided with stop, F, having pivoted in it the lever, N, and operating in combination with the ropes, S and J, screw bolts, A, with hand nuts, E, and blocks, G G, all arranged and operating substantially as described.

83,008.—SCHOOL DESK AND MUSICAL INSTRUMENT.—W. O. Trowbridge, Newton Corner, assignor to "Mason and Hamlin Organ Company," Boston Mass.

I claim, in combination with a desk a keyed musical instrument, so arranged that its keys may be concealed from view, or may be brought into position for playing substantially as set forth.

83,009.—WATER WHEEL.—Jesse Tucker and Abel B. Palmer, Adrian, Mich.

We claim a water wheel, having three series of buckets, C d and e, constructed as shown, and arranged in relation to each other, substantially as and for the purposes set forth.

83,010.—BRICK MACHINE.—Peter Walrath and Jesse Walrath, Chittenango, N. Y.

We claim the grind mill and crowding devices, a b c, endless chain of molds, D D, with movable bottoms, d, delivering wheel, L m, press, I H, with the intermittent operating devices, F f2 G2, and ratchet, e, with throwing devices, F f G, all constructed and operating as herein described for the purpose set forth.

83,011.—ANIMAL TRAP.—A. L. Waring, Coshocton, Ohio.

I claim the described trap, consisting of the box, A, having the hinged covers, b b b b, arranged as described, and diaphragm, B, with points, z z, arranged as described, the whole being combined as and for the purpose set forth.

83,012.—RECLINING CHAIR.—John W. Wetherbee, Charlestown, assignor to himself and Richard Howse, Chelsea, Mass.

I claim, in combination with the stationary seat frame and stationary arms, the swinging back, c, and foot-and-leg frame, I, pivoted to the side frame, and jointed together by links, k, and moved from vertical to inclined or horizontal position, or *vice versa* (one frame by the other), substantially as described.

Also, in combination with the adjustable back and foot piece and stationary seat, the links, k, the notches, m, and latch, b, arranged to operate substantially as set forth.

83,013.—AUTOMATIC BOILER FEEDER.—John R. Widgeon and Fred. E. Frey, Bucyrus, Ohio. Antedated September 26, 1868.

We claim the combination of the case, Q, with the chamber, A, having ports, l m, and the seat, B, provided with holes, d e f g, substantially as herein described.

83,014.—AUTOMATIC PUNCHING MACHINE.—John E. Wiggin, Stoneham, Mass. Antedated September 26, 1868.

I claim, 1st, In combination with a punching device, an automatic intermittent moving feed, to which the material to be punched is affixed, substantially as and for the purpose described.

2d, Also, the combination of the coupling, l k, with the work-feeding device through the piece x, the rocker, y, lever, l l', latch pull, o, and spring, n, or their equivalents, substantially as described.

3d, Also, the combination of the brake, m, with the lever, l l', spring, n, and fixed part, k, of the coupling.

4th, Also, the combination of a segmental rack with clamping jaws, substantially as described.

5th, Also, the combination of the piece, h', with the pull, o, for throwing the pawl, w, out of gear with the rack.

6th, Also, the employment of a friction-applying device, arranged to operate on rack, i, to steady its movement, and to prevent it from moving beyond the distance intended, substantially as described.

83,015.—CHURN DASHER.—Samuel Yates, Marshall, Mo.
I claim the combination of the hollow or tubular shaft, A, with air chamber, B, valve, C, dasher, D, and air tubes, E, as constructed and arranged substantially in the manner and for the purpose described.

83,016.—STEAM GENERATOR.—V. D. Anderson, Milton, Wis.
I claim, 1st, The arrangement of the parts, A and B, when constructed and oined together, substantially as set forth.
2d, The arrangement of the boilers, A and B, and the reservoir of the superheater, Q, substantially as described.

83,017.—GAITER BOOT.—W. H. H. Babbitt, New Corner, Ind.
I claim, 1st, In combination with a gaiter, the plates, A and E, and the folding leather, D, arranged substantially as described, for the purpose set forth.
2d, The flap, G, in combination with the plates, A and E, arranged and operating substantially as described, for the purposes set forth.

83,018.—DEVICE FOR UNLOADING HAY.—Joseph Backus, Greenvale, Ill.
I claim the derrick, A B C, in combination with the beam, D, chain, d, and hooks, e and F, all made and operating substantially as herein shown and described, and for the purpose of unloading hay from wagons, as set forth.

83,019.—WIRE CLOTH.—Thomas Baggott, Baltimore, Md.
I claim the production of wire cloth, constructed as herein described whether the ends of the webs are joined together or not, as an article of manufacture.

83,020.—LEACH TUB.—Wm. Banzett, Brooklyn, N. Y.
I claim a leach tub, constructed as described, namely: with the cover, C, battened around its edges on top, and having the hinged portion, c, and held by the clamps, B, having beveled forward ends, said clamps being hinged to the ears, a, which are secured to the sides of the tub, all arranged as herein shown for the purpose specified.

83,021.—COMBINED HATCHET, HAMMER, AND SCRAPER.—Arthur Barbarin, New Orleans, La.
I claim, as a new article of manufacture, a combined hammer, nail puller, hatchet blade, and scraper, formed of one piece of metal, substantially as herein shown and described.

83,022.—BOX OPENER.—Arthur Barbarin, New Orleans, La.
I claim the herein described tool for opening cigar boxes and other articles as a new article of manufacture.

83,023.—SHOEMAKERS' IMPLEMENT.—Arthur Barbarin, New Orleans, La.
I claim, as a new article of manufacture, a tool, the shank and handle of which are combined with the hammer head, claws, and rotary cutting disk, with or without the screwdriver, in the manner and for the purposes set forth.

83,024.—LIQUID SAMPLER.—Arthur Barbarin, New Orleans, La.
I claim, 1st, The combination of the induction tube of a siphon with a discharge pipe provided with a throat for receiving said induction tube, a vacuum-creating rubber bulb, and stop cock, c d", located, one on each side of said throat, with or without the reservoir, C, between them, substantially in the manner and for the purposes shown and set forth.
2d, The receiving chamber or reservoir, C, arranged between the induction end of the pipe and the rubber bulb, substantially in the manner herein shown and for the purpose described.
3d, Providing the liquid-receiving chamber or reservoir of the siphon or liquid sampler with a discharge tube and cock, as shown in fig. 4, of the accompanying drawings, by means of which the liquid in said chamber can be drawn off, substantially as and for the purposes specified.
4th, The combination, with the screw-threaded end of the siphon, of a nut, grooved and provided with pins, by which the said siphon may be held to the vessel to which it is applied, substantially in the manner herein shown and set forth.
5th, A liquid sampler, consisting of a hollow rubber bulb, in combination with a tapering tube provided with a stop cock at or near the point where it is united with the said bulb, with or without a reservoir of glass or other suitable material interposed between the said stop cock and the open end of the said tube, substantially as and for the purposes herein shown and specified.

83,025.—SOFA BEDSTEAD.—W. P. Barclay, Chicago, Ill.
I claim, 1st, Constructing the back of a sofa so that the same forms a complete bed, substantially as specified.
2d, The frame, C C', D D', in combination with the seat and ends of the sofa, and forming the back thereof, and pivoted to the ends, so as to turn forward, substantially as and for the purposes specified.
3d, The folding head and foot boards herein described, in combination with the frame, C C' D D', and ends and seat of a sofa, substantially as and for the purposes specified.
4th, The supporter, f, in combination with the headboard herein described, and frame of the back of the sofa, substantially as and for the purposes set forth.
5th, The jointed arm, I J, constructed substantially as and for the purposes specified.
6th, The pieces, C C', in combination with the end pieces, E, of a sofa, and slats, a, when so constructed as to form both the back of a sofa, and also a complete bed, substantially as described.

83,026.—GAS GENERATOR.—J. A. Bassett, Salem, Mass.
I claim an apparatus for charging air with hydro carbon vapor, automatically revolved by the weight of the column of vapor, and used in combination with the chamber, C, substantially as set forth

83,027.—PUMP.—W. D. Baxter, New York city.
I claim the pistons, e, and yoke pieces, p, actuated by the rollers, o, and lever, l, in combination with the pumps, d d, and water way, f, provided with stuffing boxes for the piston rods, n, and an air vessel, k, the parts being arranged and constructed substantially as specified.

83,028.—PIPE-MOLDING MACHINE.—Benjamin S. Benson, Baltimore, Md.
I claim, in combination with a revolving flask, a non-revolving but rising and falling screw packer, which rests upon and rises with the sand packed in the flask, and is guided in its rising, substantially as and for the purpose set forth.

83,029.—PACKER FOR PACKING SAND IN MOLDERS' FLASKS.—B. S. Benson, Baltimore, Md.
I claim the packing instrument, with a screw thread of gradually diminishing pitch from the first end, and a zinc or other soft metal or alloy of meal fillet under and around it, as and for the purpose herein described and represented.
Also, in combination with the screw thread and fillet, the sectional and removable steel plates, D and E, substantially as and for the purpose described.

83,030.—PLOW.—M. Berdan, Maumee City, Ohio.
I claim the slotted bar, F, and screw rods, E and H, so arranged that the share, G, can be adjusted both vertically, laterally, and longitudinally, as specified.

83,031.—COMPOUND FOR INSULATING TELEGRAPH AND ELECTRIC WIRES.—S. C. Bishop, New York city.
I claim the insulating compound for telegraph and other electric wires or conductors composed of the ingredients described, in, or about in, the proportions specified.

83,032.—WAGON BRAKE.—S. R. Bolton, Prescott, Wis.
I claim, 1st, The brake shoe, e, constructed as described, with its rear face inclined downward, and sliding by the dovetailed edge, i, and bent plate, h, upon the rollers, g, in the box, f, all arranged as described for the purpose specified
2d, The arrangement of the bent lever, j, connecting rods, k l m, lever, n, spring, p, rod, o, guide iron, d, brake bar, a, box, f, and sliding shoe, e, all operating as described for the purpose specified.
3d, The arrangement of the brake bar, a, sliding by means of staples upon the guide iron, d, the box, f, rollers, g, and sliding shoe, e, as herein described, for the purpose specified.

83,033.—CORN HUSKING MACHINE.—David Bookwalter, Gardner, Ill.
I claim the combination of the rollers, A, provided with the grooves, a, and the teeth, B, and the shields or cleaners, C, all constructed and arranged as shown and described.

83,034.—FOLDING CHAIR.—Asahel C. Boyd, Grafton, Mass.
I claim the standards, A A, B B, pivoted at a a, and provided with strengthening rounds or cross bars, in combination with the pieces, H H, curved hinges, I I, or their equivalent and hinged connecting rods or plates, J J, when the several parts are constructed to operate in the manner and for the purposes above described.

83,035.—VELOCIPEDE.—Chas. K. Bradford, Lynnfield, Mass.
I claim, 1st, Connecting the body of a velocipede to its driving shaft, in such manner as to vary the position of such body, and its seat, with respect to such driving shaft, in manner and for the purpose as hereinbefore explained.
2d, Combining with a velocipede a compound crank, or series of cranks, or eccentrics of different radii, for enabling the speed and power of the velocipede to be varied, essentially as herein shown and described.
3d, The arrangement of the rope, n, or its equivalent, as affixed to the forked bar, m, and supported and guided by the guides, o o1 o2 o3 o4 o5, or their equivalents, substantially as before described, and herein shown.
4th, The combination, with the body of a velocipede, of a seat adjustable thereon, substantially in the manner and for the purposes set forth.
5th, The combination of the body of a velocipede, formed as described, and its adjustable seat, with a compound crank, or its equivalent, substantially as and for the purposes set forth.

83,036.—PLOW.—James Campbell, New Town, Ill.
I claim, 1st, The partially revolving square beam, B, carrying plows or shovels, secured to the plow frame at an acute angle to the line of the draft, constructed and operating substantially as and in the manner set forth.
2d, In combination with the above, the stirrups, F F, lever, D, notched bar, E, brace chains, M M, cross piece, P, and the angle axles, N N, the whole arranged and operating substantially as set forth.

83,037—COMPOSITION FOR FORMING BUILDING BLOCKS, PAVEMENTS, TILES, ETC.—Samuel E. Carr, Danville, Pa.
I claim an improved composition for forming building blocks, pavement tiles, etc., formed of the ingredients, and in the proportions and manner substantially as herein set forth and described.

83,038.—FENCE.—J. M. Chaplin, Middleport, N. Y.
I claim the wires, C C, with the wheels, E E, spring, D, and pickets, B, all arranged in connection with the posts, A A', substantially as and for the purpose set forth.

83,039.—CHILD'S PEDAL FOR PIANOS, ETC.—Carl August Class, St. Louis, Mo.
I claim the stool, A, and the pedal slides, B, when employed as and for the purpose described and set forth.

83,040.—DROPPER FOR HARVESTER.—George R. Clements, Prescott, Wis.
I claim the lever, H, composed of two parts, l l', connected by a pivot m, in combination with the cut-off and grain discharger, connected to said lever in the manner substantially as and for the purpose specified.

83,041.—HAMES FOR HARNESS.—D. Clemons, Scranton, Pa.
I claim the lever, E, hook, F, and holding ring, G, in combination with the chain, D, and the lower end of the hames, A, substantially as shown and described, and for the purposes specified.

83,042.—CAR BRAKE.—Joseph Cockshoot, Jr., and Henry Weatherill, Manchester, Great Britain. Antedated October 10, 1868.
We claim the combination of the longitudinal bar or plate, b, and its racks, the pinions on the axles, and the springs, m m, the whole being arranged and applied to a railway car, substantially as and for the purpose herein set forth.

83,043.—AIR SPRING.—Jackson Corriston, Sandusky City, O.
I claim an air spring, constructed as herein described, and provided with the valve, I, in combination with the spring, A B, composed of metallic disks, substantially as and for the purpose set forth.

83,044.—WATER WHEEL.—Gardner Cox, of Pierpont, N. Y.
I claim the buckets, G, composed of three parts, a b c, arranged as shown, when said buckets are attached to the concave periphery of the hub or body, F, of a wheel, as and for the purpose herein set forth.

83,045.—VISE.—John C. Crumpton, Philadelphia, Pa.
I claim, 1st, The bed piece, A, jaw, B, and shield, C, when cast in one piece, and provided with the slots, D D, substantially as and for the purpose described.
2d, The combination, with the same, of the sliding jaw, F, when fitted to operate in connection therewith, and provided with the nut, G, substantially as and for the purpose described.
3d, The arrangement of the cap, I, and screw, L, and stationary jaw, B, with the remaining vise, in the manner and for the purpose described.

83,046.—GATE.—Stephen S. Davis, Edgerton, Wis.
I claim the combination of the wires, a a, levers, F F, and handles, G G, or their equivalents, for the purpose of opening and closing the gates, C C, substantially as herein set forth.

83,047.—FEEDING ROLLER FOR CIRCULAR SAWS.—E. C. Dicey, Montague, Mich.
I claim the feed roller for edging saws, provided with V-shaped grooves and projections at right angles to its axis, for the purpose of preventing lateral movement of the board while being fed to the saws, as herein shown and described.

83,048.—FISH BAIT CUTTER.—Valentine Doane, Jr., Harwich Port, Mass.
I claim a mill for cutting fish bait, having cylinder, A, plates, f and h, and the series of knives connected therewith, as described and shown; plank, C, block, D, bottom, E, and cover, K, constructed and arranged substantially as specified.

83,049.—COAL STOVE.—C. S. Doolitell, Mansfield, Ohio.
I claim, 1st, The arrangement of the air pipe, C, fire chamber, B, slotted pipe, H, and flattened flues, F, whereby the current of air entering the pipe, C, is heated in its passage through the fire chamber, and distributed through the slotted pipe, H, into the series of flattened flues, E, where it mingles with the cool air entering said flues through the pipes, D, as herein shown and described.
2d, The flattened air flues, E, constructed as described, and arranged in respect to the outer case, F, and egress draft openings of the fire chamber, B, substantially as herein shown and described, and for the purpose set forth.
3d, The combination of the slotted pipe, H, with the flattened flues, E, and with the pipe or pipes, C, passing through the fire chamber, B, substantially as herein shown and described, and for the purpose set forth.
4th, The combination and arrangement of the air pipes, D, with the fire chamber, B, and with the flattened flues, E, substantially as herein shown and described, and for the purpose set forth.

83,050.—CHURN.—William C. Douthett, Rochelle, Ill.
I claim, 1st, The double oscillating or swing joint, when constructed substantially as above described, and for the purposes set forth.
2d, The hub, P, in combination with the adjustable rod, F, arms, H, ring, I, piece, K, and rod, O, all operating to regulate the length of the stroke of the dasher, C, as well as to produce the stroke itself, substantially as described.

83,051.—PUMP.—C. H. Dreyer, Nashville, Tenn.
I claim the fixed piston, D E, constructed of two parts, and provided with the valves, a and b, c and d, and their passages, e f g, and h i, leading to the lower and upper parts of the cylinder, and the passages, k l, all substantially as and for the purpose described.

86,052.—AUTOMATIC CAR COUPLING.—Albert J. Elder, Kansas city, Mo.
I claim the spring bar, D, when provided with the hook, m, and arranged in the open draw head, A, to operate in connection with the tooth, a, in the manner and for the purpose specified.

83,053.—WINDOW SHUTTER.—Frederick Engel, Romeo, Mich.
I claim a window shutter, composed of metal plates, C, which are separately formed with rolls and overlapping edges, and connected by metal rods, D, forming hinges that work in opposite directions, and when folded up, constituting a roof to shield the window from snow or rain, all as herein shown and described.

83,054.—OAT-DUSTING MACHINE.—Richard Exelby, and George W. Marshall (assignors to themselves, John S. Lacy, Jr., and John A. Seymour), Buffalo, N. Y.
We claim the arrangement of the hopper, K, rod and valve, y w, vibrating screen, R, operated by eccentric, t, and rod, u, pipe, k, fan, J, distributing board, x, beaters, I, crank, q, and gearing, p o m l, forming a portable oat dusting machine, constructed as herein set forth.

83,055.—SAFETY BRIDLE.—E. R. Ferry, New Haven, Conn.
I claim, 1st, The check bars, E E, provided with the levers, c c, for the passage of the driving reins, when connected to the bar, a, by the swivel joint, b, whereby either rein is adapted to be pulled to guide the horse, without pressing the check bars against the sides of his mouth, as herein shown and described.
2d, The combination of the detachable check rein, J, with the driving reins, I, when said parts are used in connection, or applied with the check straps, D D, and the bit, F, all arranged substantially as and for the purpose specified.

83,056.—CARRIAGE CURTAIN FASTENING.—John C. Fish, Barnstable, Mass.
I claim a carriage curtain having button holes, each with an inserted elastic across the head of the slit thereof, substantially as shown and described.
Also, in combination with each button, having an oblong crown shaped head, an elastic, which holds the edge of the eye close to the sides of the shank, substantially as shown and described.

83,057.—CHURN.—Nathan C. Folger, New Orleans, La.
I claim the arrangement of the churn, A, with relation to the rockers, D, when the latter are provided with the springs, F, and all the parts are constructed and united in the manner and by the means substantially as herein described, for the purpose set forth.

83,058.—TOY PISTOL.—Wilmer D. Gridley, New Britain, Conn.
I claim the barrel and stock, a b, in one piece, spring, e, trigger spring, l f, spring, g, and orifice, d, substantially as and for the purpose described.

83,059.—HORSE POWER.—John A. Haffner, Commerce, Mo.
I claim the combination of the shaft, C, wheel, F, or casing, D, and coiled spring, a, when said spring is provided with an interior coiled rubber spring, e, to support the exterior spring, and relieve the strain thereon, all substantially as shown and described.

83,060.—ENGINE GOVERNOR.—William S. Henson, N.Y. city.
I claim the revolving spindle, A, collar, F, and ball, K, connected to which are the forked arms, C C, cross heads, M M, balls, D D, and pivoted bars, I I, the several parts being constructed, arranged and operating substantially in the manner as specified.

83,061.—PLOW.—Rozander S. Higgins, Olney, Ill.
I claim the combination of the prolonged colter, I, with its rearwardly curved cutting point, I', and the obliquely presented share, D, so arranged that its sole does not run in contact with the floor of the furrow, all constructed and operating as and for the purposes herein specified.

83,062.—IRON DOOR.—Lewis Hover, Chicago, Ill.
I claim the combination of the outer and inner doors, B B, and their cogged hinges, A A, when secured by the double latch, D, or its equivalent, all substantially as and for the purposes herein shown and specified.

83,063.—HORSE HAY FORK.—C. A. Howard, Pontiac, Mich.
I claim, 1st, The parts, A and B, of a horse hay fork, provided with corrugated, grooved, or otherwise roughened surfaces, arranged to be locked together in any preferred position, by a lever and inclined ways, substantially as and for the purpose described.
2d, The combination with the parts, A and B, arranged to be locked as described, of a spring for separating them for unlocking, substantially as and for the purpose described.

83,064.—GEARING FOR GRINDSTONES.—Francis Howlett, West Rupert, Vt., and Charles R. Sherman, Salem, N. Y.
We claim the slotted adjustable block, G, carrying the wheel, E, and adapting it for adjustment with the pinion, D, substantially as and for the purpose described.

83,065.—PUMP.—Chas. W. Hoyt, South Norwalk, Conn.
I claim the arrangement herein shown and described of the operating lever E, chains, D, pulleys, a b, and brake, C, with relation to the double acting pump, A B, all as set forth, for the purpose specified.

83,066.—FUEL FROM SPENT TAN BARK.—Benjamin Irving, New York city.
I claim the new manufacture of compressed fuel from spent or refuse tan bark, by the method or process of forming it into blocks, or other suitable shapes, for fuel and transportation, substantially as hereinbefore described.

83,067.—MACHINE FOR GRINDING THE CUTTERS OF MOWING MACHINES.—D. W. Jameson, Warren, Ohio.
I claim the standards or arms, F, hinged or pivoted to the bridge tree, E, in combination with the adjustable frame, G, arranged and operating conjointly, as and for the purpose substantially as set forth.

83,068.—HORSE HAY FORK.—C. H. B. Kellogg, Tontogany, Ohio.
I claim a hay fork constructed and operating substantially as shown and described, that is to say, with the head, A, central rod, B, hooks, C C, rods, E E, catch, I, and lever, K, arranged substantially as described, for the purposes set forth.

83,069.—CAKE MIXER.—James Lafetra, New York city.
I claim the arrangement of the beater, D E, and the quadrangular yoke, E, bearing the standing fingers, G, suspended from the cover, B, in such a manner that the beater is permitted to revolve while the yoke, F, and its fingers remain stationary, as herein described, for the purpose specified.

83,070.—PACKING CAN.—N. P. Lindergreen, Boston, Mass.
I claim as a new article of manufacture, and octagonal sheet metal can, having four narrow and four wide sides, made of four sheets of metal connected by joints, constructed and arranged as herein shown and described.

83,071.—SPADE.—Johan Linnemann, Copenhagen, Denmark.
I claim, 1st The blade of a spade constructed with one or both of its vertical edges serrated, substantially as described.
2d, In combination with the blade and handle socket of a spade, a detachable handle, B, substantially as and for the purpose set forth.

83,072.—WORK TABLE APPLIANCE.—J. G. Lucas, Newark, N. J.
I claim the device or appliance composed of the annular spool holder, B, pin cushion, A, mirror, E, scissors holding clasps, d, emery case, C, serving also as a thimble holder, and thread cutter, D, the whole arranged substantially as and for the purpose specified.

83,073.—COMPOUND FOR TANNING.—Samuel Lusten, Linesville, Pa.
I claim the compound composed of the above ingredients, combined in the proportions set forth.

83,074.—ANIMAL TRAP.—Wilson McClure, Sinking Spring, Ohio.
I claim the described arrangement of the spring, H, roller, G, bar, D, cross head, E, spikes, F, spring, K, roller, J, trip lever, I, and bait rod, L, with relation to each other, the bottom, A, posts, B, sides, C and removable casing M, all operating as described, for the purpose specified.

83,075.—LINE HOLDER.—D. W. C. McMaster, Southborough, Mass.
I claim the disks, B C, constructed as described, with the radial ribs, and arranged with relation with each other and the fixture, A, in the manner herein set forth, for the purpose specified.

83,076.—DEVICE FOR HEATING RAILROAD CARS.—Francis Meddock, Mainsville, Ohio.
I claim the steam chamber, B, beneath the car floor, traversed longitudinally by steam pipes, D, which are attached, as between adjacent cars, by flexible connections, E, and which are provided in the chamber of each car with branch pipes, F, and valves, g, operateable from the inside of the car, and adapted to be closed or opened, as the necessities of each car in the train may require, substantially as described.

83,077.—GRAVE MOUND.—Jonathan Meley, Trenton, Tenn.
I claim the grave mound, when formed by casting the raised portion, A, with a layer of cement, enclosed by the brick border, and covered with a compact coating of shells, C, as herein shown and described.

83,078.—MACHINE FOR BENDING WOOD.—Joshua Merrill, Boston, Mass.
I claim, in combination with the toothed feed roll, b, the concave shaper block, c, constructed and arranged relatively to the roll, substantially as shown and described.
Also, in combination with the toothed feed roll, a sharper block, made adjustable, substantially as set forth.

83,079.—BALING PRESS.—John F. Milligan, St. Louis, Mo.
I claim combining the screw threaded shaft, D, sectors, D', and platen, C, the toggle levers, G, and rods, E, in the manner herein shown and described.

83,080.—CHURNING APPARATUS.—Ed. J. Moore, Westfield, N. Y.
I claim, 1st, The combination of the pivoted bars, J, H, F, and G, with the lever, E, and dasher shaft, I, substantially as described, for the purpose specified.
2d, The combination of the connecting rod, L, with the heavy or weighted lever, K', and with the parallel levers or bars, F, substantially as herein shown and described, and for the purpose set forth.
3d, Extending the pivoted bars, H, above the lever, E, and connecting them with the dasher handle, I, by means or the short connecting bars, J, substantially as herein shown and described, and for the purpose set forth.
4th, Extending the heavy or weighted lever, K, through the upright, D, and pivoting it at or near its center, substantially as herein shown and described.

83,081.—NUT LOCKING DEVICE.—Wm. Morehouse, Buffalo, N. Y.
I claim the forked nut locking device, D, constructed with a shoulder, b', and with separated portions, b b, substantially as and for the purpose described.

83,082.—MACHINE FOR TURNING BROOM HANDLES.—G. M. Morrow, Clarksville, Ohio.
I claim, 1st, Controlling the cutters, through the medium of the plates, sliding at right angles to each other, the catches, n n', and the cam wheels, E, constructed to operate substantially as described.
2d, The combination of the sliding plates, M M', N N, catches, m m', n n', wheels, E, having flanges, n", and shaft, E', with the hollow mandrel, K, pivoted lever, r a, link, r', cutters, l l", and springs, s s', substantially as described for the purpose specified.

83,083.—COMBINED HUB AND BOX FOR WHEELS.—Samuel Mosher, Winchester, Ill.
I claim the combination of set screws, e, with flange, C, and washer, s, the whole constructed and arranged substantially as specified.

83,084.—LADDER.—P. M. Papin, St. Louis, Mo.
I claim the rail, A, spreading feet, A1, sliding feet, A2, truss rods, b, cross bar, b1, angle blocks, b2, and hook, C, the whole being combined and arranged in the manner described and for the purpose set forth.

83,085.—COOKING STOVE.—Alexander G. Patton, Troy, N. Y.
I claim, 1st, A stove, so constructed as to embrace within itself a water-heating reservoir, and a warming closet, both of which form a constituent part of said stove, the same being arranged substantially as shown and described.
2d, The flue, S, formed in the water reservoir, substantially as and for the purpose shown and described.
3d, The construction of the vertical descending flue or flues, 2 2, for directing the greatest portion of the heat towards the ends of the oven, by means of the curved form of the fixed reservoir plates, as shown and described.
4th, The arrangement of the fixed water reservoir, with reference to the flues, 6 and 7, which surround said water reservoir, substantially as shown and described.
5th, The arrangement of the damper, 9, with reference to the flue, S, and the additional aperture in the cover, G, of the stove.
6th, The arrangement of the flues, 1, 2, 3, 4, 5, 6, 7, and 8, substantially as and for the purpose described.

83,086.—COOKING STOVE.—Alexander G. Patton, Troy, N. Y.
I claim, 1st, A stove, having combined within it a second or extra oven and a water heating reservoir, which form constituent parts thereof, substantially in the manner shown and described.
2d, The combination of the water reservoir, E, and the second or extra oven F, when forming fixed or permanent parts of a cooking stove, and arranged substantially as and for the purpose specified.
3d, The arrangement of the flues, 1 2, 3 4, 5, 6, and 7, with reference to the ovens, C F, and water reservoir, E, when constructed as herein shown and described.

83,087.—HAMES FASTENER.—Wm. H. Payne, Janesville, Wis.
I claim, 1st, Drawing the hames together by means of a levered cog wheel, D C, and toothed bar, A, substantially as herein shown and described.
2d, The combination of the toothed bar, A, cap, B, cog wheel, C, (having a lever, D, formed upon or attached to it), and slotted bar, E, with each other, substantially as herein shown and described, and for the purpose set forth.

83,088.—DAMPING APPARATUS FOR COPYING PRESS.—Adolph Pearl, New York city.
I claim the combination of the leather covered dampening roller, B, the moistened cushion, D, and the water bath in the case, A, substantially as described, and for the purpose herein set forth.

83,089.—PLANING MACHINE.—F. K. Plumbly, Buffalo, N. Y.
I claim the combination of the hand plane, A, with the suspending rod, B, box, D, rest pin, C, and gage block, E, all constructed to operate substantially as described.

83,090.—AWNING.—Royal P. Pratt, Hartford, Conn. Antedated October 6, 1868.
I claim, 1st, The combination of the pulley, D, and end block, G, with the rods, I and J, when constructed and arranged substantially as herein described, for the purpose of winding up and sustaining an awning.
2d, The cords, m n o p q, arranged as herein described, for the purpose of raising and folding under the end flaps of an awning.
3d, The combination of the cord, m n o p q, the slotted tube, K, and the spring, s, or its equivalent, constructed and operating substantially as herein specified.

83,091.—ELECTRICAL AMALGAMATOR.—Julio H. Rae, Syracuse, N. Y.
I claim the drum, A, provided with a lining and with a beater, representing the two elements of a galvanic battery, said beater serving also to bring all the particles of the pulverized ore in intimate contact with the mercury substantially as herein shown and described.

83,092.—CONDENSER.—Franklin Ransom, Buffalo, N. Y.
I claim, 1st, The arrangement with the condenser, A, and main induction-pipe, B, of the overflow pipe, d, and small pipes, d1 d2, as herein set forth.
2d, The arrangement of the secondary injection pipe, I, in relation to the partitioned condenser, A, and boiler feed pipe, J, as set forth.

83,093.—CORN CULTIVATOR.—Edward F. Rate, Cedar County, Iowa.
I claim the levers, A and J, roller, F, and regulating bars, D, when constructed and arranged substantially as and for the purposes herein specified.

83,094.—ANIMAL TRAP.—Edward Reichard, Washington, Mo.
I claim, 1st, The trap, formed of the base, A, the fixed lobe, B, journal, D, spring, E, and movable lobe, C, substantially as and for the purposes set forth.
2d, The combination of the trip lever, f, the spring, e, its cam, e1, and detent spring, b, substantially as and for the purposes set forth.
3d, The spring catch, G, in combination with the lobe, C, when arranged to secure said lobe to the base plate, A, by the detent, g, substantially as set forth.

83,095.—VALVE MOTION FOR STEAM ENGINES.—Hugh Reid, St. Louis, Mo.
I claim, 1st, The forked rod, D, its ends, d, slotted at d*, the pins, e, with the toggle links, E, cross head, F, and spring, G, combined substantially as set forth.
2d, The rock shaft, B, in combination with the rod, D, links, E, valve stem, c, and valve, C, substantially as set forth.
3d, The combination of the valve, C, the exhaust pipe, A, the discharge pipe, H, and atmospheric valve, I, as set forth.

83,096.—FANNING MILL.—Geo. Richards and David Strickland, Richland Center, Wis.
We claim, 1st, The adjustable sliding flanged board, K, constructed

arranged substantially as herein shown and described, in combination with the shoe, I, as and for the purpose set forth.

2d, Suspending the shoe, I, in the center of the shoe chamber, by means of the springs, J, substantially in the manner herein shown and described, and for the purpose set forth.

3d, The combination of the sliding gate, M, connecting rod or rods, N, lever, O, and ratchet bar, P, with each other and with the opening in the top of the case, A, substantially as herein shown and described, and for the purpose set forth.

4th, The rectangular hopper, Q, constructed and arranged substantially as herein shown and described, in combination with the hopper shaped top of the case, A, as and for the purpose set forth.

5th, The fans, D, formed with projecting wings, d', upon their central parts, substantially as herein shown and described, and for the purpose set forth.

6th, The bag-holder, W, constructed substantially as herein shown and described, in combination with one of the posts, B, of the frame of the mill, as and for the purpose set forth.

7th, The receiving measure, formed by the combination of the sliding gate Y, and rod, Z, with the box, X, substantially as herein shown and described, and for the purpose set forth.

83,097.—POCKET SAFE FOR FRICTION MATCH CORD.—Wm. H. Rogers, New York city.

I claim the match safe, A, constructed substantially as described, or in any equivalent manner, whereby the coil match and the tube, E, may be properly secured and used, substantially as set forth.

In combination with a friction-match cord, the tube, E, either hinged or attached to a match-safe or box, or not, and either cut away on one or both sides, substantially as and for the purposes described.

83,098.—FRUIT PICKER.—Jeremiah Schroy, Fortville, Ind.

Antedate October 2, 1868.

I claim the curved metal plate, C, connected to the outer ends of the irregular shaped hoop, B, and provided at its upper portion with a series of narrow slots for forming the comb teeth, pointed as shown, and used in combination with the pole, A, and conveyer, F, to operate substantially as set forth.

73,099.—BEER COOLER.—Louis Schulze, Louisville, Ky.

I claim, 1st, A beer cooling apparatus, consisting of a series of contiguous and connecting double bottomed pipes or channels, one above another, in vertical line, and inclined towards each other, when said pipes or channels are made with square sides and bottoms substantially as and for the purposes set forth.

2d, A beer cooling apparatus, consisting of a series of contiguous and connecting double bottomed pipes or channels, one above the other, in vertical line, the water channels of which, at the contiguous ends, are so constructed that they can be opened, substantially as and for the purposes set forth.

3d, A beer cooling apparatus, consisting of a series of contiguous and connecting double bottomed pipes or channels, one above the other, in vertical line, the water channels of which, at contiguous ends, are closed by a packing of water-proof material, non-conductor of heat, substantially as and for the purposes described.

4th, In a beer cooling apparatus, the application, in combination with water for cooling purposes, of a blast of air which has been passed over ice, and strikes the beer at right angles to its flow, substantially as and for the purposes set forth.

5th, The combination, in a beer cooler, of the double bottomed channels, B, with perforated air pipes, E, substantially as and for the purposes set forth.

6th, The combination in a beer cooler, of the rollers, j, provided with paddles, k, with the double bottomed channels, B, substantially as and for the purposes described.

83,100.—SOLDERING VESSEL.—Conrad Seimel, Greenpoint, N.Y.

I claim 1st, The stands, A, in combination with the troughs, B B, and the gas apparatus, C, as herein described, for the purpose specified.

2d, The troughs, B, in combination with the shelves, b, as and for the purpose set forth.

83,101.—LAWN MOWER.—John Shaw, Brooklyn, N.Y. Patented in England January 23, 1864.

I claim folding the cutting end of lawn mowing machines up toward the handle end, for the purpose of being used for rolling only.

83,102.—BUCKLE.—Perry W. Smith, Abingdon, Ill.

I claim, as an article of manufacture, the within described double buckle, when constructed and operating substantially as and for the purposes herein set forth.

83,103.—MACHINERY FOR PRINTING YARN.—E. J. Stephens, Pawtucket, R. I.

I claim, in combination with suitable ribbed printing cylinders, A A, a series of furnishing color rollers, D D, hung in yielding bearings, and operated by means of pinions, G, with teeth of variable depth, or the equivalents thereof, in the manner substantially as described for the purposes specified.

83,104.—GAS FURNACE FOR HEATING SOLDERING TOOLS.—J. H. Stimpson, Boston, Mass.

I claim the gas furnace for heating soldering tools, consisting of the double cones, A B, supporting the inclined cylinders, D E, containing the perforated cylinders, F G, composed each of two parts, f1 f2 g1 g2, said cylinders, D E, connected at their rear ends by the mouth pieces, d3 e3, and at their forward ends by the curved pipes, h2 h3, all arranged and operating as described for the purpose specified.

83,105.—CORN PLANTER.—S. L. Sweeney, Morrison, Ill.

I claim, 1st, The combination of the roller wheel, G, arm, H, rod, I, and oscillating plate, F, arranged to operate substantially as and for the purpose set forth.

2d, The combination of the wheel, G, the arm, H, connecting rods, I and N with the two oscillating wheels, F, arranged substantially as set forth.

3d, The combination of the wheel, G, with holes G', and arm H, with holes H', for connecting and disconnecting the wheels and the dropping mechanism, substantially as set forth.

83,106.—SUGAR-JUICE EVAPORATOR.—James Taylor, Canton, N. Y.

I claim the described construction of the pan, A, having its sides extended to form legs, f f, and the side walls of the fire box, the latter provided with the door, h, at one end, and the chimney, B, at the other, all arranged to be moved upon the wheels e, away from or over the grate, D, formed between the ways, C, as herein set forth for the purpose specified.

83,107.—SEAM JOINT FOR CANS, ETC.—E. A. Thomas, Philadelphia, Pa.

I claim a side seam or joint for sheet-metal cans or boxes, composed of a dovetail projection, a, struck or swaged upon the lapped edges of the metal, and then hammer or closed down, substantially as herein shown and described.

83,108.—STEAM GENERATOR.—J. L. Thomas, Alliance, Ohio.

I claim, 1st, The combination of the float, B, chain, C, and eight J, with the serrated wheel, D, graduated wheel, E, adjustable plate, i, slotted arm, h, cock, G, and pipe, F, as herein set forth.

2d, The arrangement of the pipe, o, lever, R, and adjustable pin, S, with reference to the wheel, D, and whistle, P, as herein described.

83,109.—DEVICE FOR STRETCHING TELEGRAPH WIRES.—G. M. Thompson, Boston, Mass.

I claim the within described instrument for stretching telegraph wires, consisting essentially of the plate or bar, A, and jaws, C C, as set forth.

83,110.—HAY RAKE AND LOADER.—J. J. Thompson, Richwood, Ohio.

I claim the combination of the rotating device, F' H, rake, G, endless carrier D, pins or fingers, w, and stationary plate, f 12, all constructed, arranged, and operating in the manner and for the purpose set forth.

83,111.—CULTIVATOR.—J. J. Thompson and V. F. Collier, Richwood, Ohio.

We claim the combination, in a quadruple plow or cultivator, of the inner movable beams, B B, staples, b b, rod, F, plates, D D, outer stationary beams B' B', tongue, A, plate, I, and handles, L L, all applied in the manner and for the purpose set forth.

83,112.—SASH LOCK.—E. H. Tobey, Bridgeport, Conn., assignor to himself and A. B. Hale.

I claim the arrangement of the bolt, A, within the cylinder, C, when the said cylinder is provided with two slots, a and d, and the bolt with the stud, f, to operate in the said slots, substantially in the manner specified.

83,113.—DIAPHRAGM BELLOWS FOR DRY GAS METER.—A. Tufts, Malden, Mass. Antedated Oct. 3, 1868.

I claim a gas-meter bellows in which one head is annular, with an attached flange, to which the flexible material of the bellows is secured, and in which head the opening through which the former is extracted in parts is closed by soldering the disk, 1, at its edge which is remote from the cord, h, which secures the flexible material, g, to the flange, e, substantially as described.

83,114.—CALORIC ENGINE.—H. D. Wallen, Jr., Fort Columbus, N. Y.

I claim, 1st, The two parallel cylinders, A B, when arranged side by side, and provided at both ends with air-heating chambers, A' A'' B' B'', and the valve gear to cause the alternate movement and resting of the pistons, all substantially as shown and described.

2d, The rocks shafts, P P', having arms, e R R', the connecting rods, S S' T, and angular lever T', substantially as herein shown and described, in combination with and arranged with relation to the shaft, M, slotted plate, U, slotted arm, V, and crossheads, R'', as set forth.

83,115.—PAPER CUTTER AND RULER.—S. W. Wilcox, Mendon, Mass.

I claim, 1st, A paper cutter, provided with a series of parallel slits for ruling parallel lines, substantially as herein described.

2d, The construction of a ruler with a perforated scale, substantially as and for the purpose herein set forth.

83,116.—STOP MOTION AND INDICATOR FOR KNITTING MACHINE.—Elihu Wilder, Chicopee Falls, Mass.

I claim, 1st, The shaft, H, carrying the adjustable fingers, h h' h'', substantially as described.

2d, The combination of the bolt, G, with the pawl, G', and ratchet, G'', and shaft, H, carrying the fingers, h h' h'', made adjustable, and held in position by set screws or thumb screws, and operating upon the pawl of a ratchet, for the purpose of stopping the machine at any number of rounds or stitches, substantially as set forth.

3d, The combination of the shaft, H, having the adjustable fingers, h h' h'' with the ratchet, G'', pawl, G', bolt, G, sliding bar, E', having the trip dog E, and the cam grooved cylinder, C, applied to a knitting machine, substantially as described.

83,117.—CHAIN PUMP VALVE.—Orrin O. Witherell, Lewiston, Me.

I claim the plates, A B, having the links, D D, secured upon the elastic plate, C, and washer, F, by means of the countersunk screw, E, extending centrally through the plate and washer, between the ends of the link into a nut, G, between the ends of the link upon the plate, B, as herein described and shown.

83,118.—PIPE COUPLING.—William H. Yeaton, Philadelphia, Pa.

I claim, 1st, The combination of the portions, A and B, of the coupling with the yoke, D, the whole being constructed and arranged substantially as and for the purpose described.

2d, The plug, C adapted to the portion, B, of the coupling, and having a handle, i, arranged in respect to the yoke, D, substantially as set forth.

3d, The combination, with the yoke, D, of a lid or bonnet, F, having lugs, t t, and hinged or otherwise adapted to the portion, B, of the coupling, for the purpose specified.

82,119.—MANUFACTURE OF IRON AND STEEL.—Richard Yielding, Detroit, Mich.

I claim, 1st, The process of fusing and refining metal, and decarbonizing iron.

2d, The converting of iron into carbonized steel.

3d, The converting of iron into unannealable steel, and the use of the foregoing articles, in the manner and for the purposes herein set forth, and the general combination of the principles, and the use of the articles, combined and separately, and for the use of the oil alone, in the manner and for the purposes set forth in the foregoing specifications.

83,120.—TABLE CLOTH PROTECTOR.—Mrs. J. H. Mott, Washington, D. C.

I claim a table-protecting apron, formed with raised edges, a a, and attaching straps, c c and e, the whole constructed and arranged substantially as described, for the purposes specified.

83,121.—PROCESS OF ROASTING AND CHLORIDIZING ORE.—Henry Tindall, Chicago, Ill.

I claim the process of treating ores, substantially such as is above described.

83,122.—FURNACE FOR ROASTING AND CHLORIDIZING ORE.—Henre Tindall, Chicago, Ill.

I claim, 1st, A furnace for treating ores, in which the operation of desulphurizing and chloridizing or chlorinating such ores is performed simultaneously with the roasting of the same, substantially in the manner described.

2d, The chamber, E, of the furnace, as composed of a metal bottom, with metal sides and roof, said bottom and sides being protected from the action of the sulphur, substantially as shown and described.

3d, The combination of the chamber, E, and the gas generating apparatus, substantially as shown and described.

4th, The combination of the ore supplying conduit and the chamber, E, substantially as shown and described.

5th, The arrangement of the sole or hearth with reference to the chute, P, substantially as shown and described.

6th, The arrangement of the walls or partitions, C C' by which they are made to support the sole or hearth, substantially as shown and described.

7th, The arrangement of the car, R, with reference to the chute, P, and chamber, E, substantially as shown and described.

83,123.—PISTON ROD PACKING.—Orrin Collier (assignor to himself and Erva B. Silliman, Sacramento, Cal.

I claim, 1st, The metal rings, a and b, as constructed, so that they have about the same amount of surface bearing against the rod, and both about the same amount of surface bearing against the face of the gland, whereby the two shall wear equally, substantially as described.

2d, The construction of the packing with reference to the stuffing box, whereby a free space is left around the ring, so as to allow them to move freely with the rod, if it should not work perfectly true.

3d, The gland, C, and the lining, E, with the oil cup, F, when arranged substantially as and for the purpose herein described.

REISSUES.

35,925.—LAMP BURNER.—James Donning, Bridgeport, Conn. Dated July 22, 1862; reissue 3,158.

I claim a deflector or cone, having a flame slot, in combination with a sliding support, the two being connected together, and removable from the wick tube, and an air space being provided between the sliding support and the side of the wick tube, substantially as specified.

67,355.—MACHINE FOR GRINDING THE CUTTERS OF MOWING MACHINES.—Henry Richardson, New York, assignee, by mesne assignments, of Edwin M. Scott, Auburn, N. Y. Dated July 30, 1867; reissue 3,159.

I claim, 1st, In combination with a revolving grinding wheel or stone, on the end of a shaft, the vertically, or nearly so, swinging frame, for holding the reaper knife to be ground, so that it may be swung up to the stone or back, to be examined by the operator, substantially as described.

2d, In combination with the swing frame, the inclining of the clamping bar, so that the sections or edges to be ground may be brought in their entire length to the grinding surface of the stone, substantially as described.

3d, The combination of the disk, slides, and thumb screw, as and for the purpose set forth.

4th, The combination of the disk, slides, bolt, and lever, substantially as and for the purpose described and represented.

65,963.—SLEEPING CAR.—John Swan, Baltimore, Md. Dated June 18, 1867; reissue 3,160.

I claim, 1st, A series of staterooms made crosswise of the car, and provided with a side passage and independent ventilation, substantially as and for the purpose set forth.

2d, The reservoir F, pipes, H H, and basins, J J, for supplying water to the staterooms, substantially as specified.

3d, The side passage, C, when used in combination with a series of cross berths or staterooms, as and for the purpose set forth.

EXTENSIONS.

IMPROVEMENT IN SPRING ROLLERS FOR WINDOW CURTAINS, ETC.—Benjamin Bray, of Salem, Mass.—Letters Patent No. 11,638, dated September 5, 1854.

I claim providing the tubular or hollow curtain roller with a long spiral spring within it, when said spring is used for the purpose not merely of drawing up the curtain by its recoil, as that is not new, but of balancing it in any position in which it may be placed, substantially as herein described.

DESIGN FOR CLOCK CASE FRONT.—Elias Ingraham, Bristol, Conn.—Design No. 107, dated Sept. 3, 1860.

I claim the design for a clock case, as hereinabove illustrated and set forth.

CALENDAR CLOCK.—Wm. H. Akins and Joseph B. Burritt, Ithaca, N. Y.—Letters Patent No. 11,711, dated Sept. 19, 1854.

We claim, 1st, The arrangement of the four rows of teeth on wheel, L, as shown in fig. 8, in combination with the corrugated plate, N, the detent X, and the arm, O, the rocking shaft, P, and the slotted arm, Q or the equivalent of said arms and rocking shaft, and for the purposes set forth.

2d, Raising the click, 37, over four or more of the teeth of the wheel, L (when run down), on the first day of the month, thereby acquiring a retaining power sufficient to be used in the short months, thus moving the wheel, L, carrying the hand, I, on the dial, from the 28th of February, past the 29th, 30th, and 31st divisions of the wheel, L, to the fig. 1, or the 1st day of March, those teeth (the 29th, 30th, and 31st) being removed, the detent, X, stopping the wheel, L, at the point marked , on fig. 8, indicating the first day of every month, one tooth only being used, except at the last day of a short month, the rod, 39, slipping through the end of the lever, Y.

3d, We also claim the combination of the helix, V, the lever, Y, lifting rod, 39, the detent, X, the pin, 55, the click, 37, the wheel, L, and spring, 7, and for the purposes described, that is, giving movement to the wheel, L, the rollers, F G and H, being moved by similar devices.

SAFETY WASHER FOR SECURING WHEELS TO AXLES.—Wm. Thornley, Philadelphia, Pa.—Letters Patent No. 11,705, dated Sept. 19, 1854.

I claim a washer having a projecting flange and stop or stops; also the cap, with the stop or stops, as described, for the purpose specified.

MACHINE FOR WASHING PAPER STOCK.—Horace W. Peaslee, Malden Bridge, N. Y.—Letters Patent No. 12,283, dated Jan. 23, 1855; antedated Sept. 29, 1854; reissue No. 340, dated Jan. 8, 1856; reissue No. 2,515, dated March 19, 1867.

I claim a rotating pervious cylinder, provided with projecting teeth on the inside and mounted substantially as herein described, so as to be sustained and rotated without a shaft and arms, that the inside and ends may be unobstructed for the passage of the stock, substantially as and for the purpose described.

And I also claim, in combination with a pervious rotating cylinder, armed with teeth on the inside, substantially as described, the means, substantially as described, for the introduction of water through the meshes of the cylinder to the stock inside, as and for the purpose described.

FURNACE OR HEAT AND GENERATOR RADIATOR.—Gardner Chilson, Boston, Mass.—Letters Patent No. 11,718, dated September 26, 1854; reissue No. 1,582, dated September 27, 1864.

I claim, in combination with one or more tapering tubes, substantially as described, made to communicate in the fire chamber essentially as specified, a conical or tapering radiator closed at top, and arranged directly over the fire, and made to open near its base in the said tapering tube or tubes, and to operate, with respect to them, and the fire pot or chamber and the surrounding air or medium to be warmed or heated, substantially as specified.

I also claim arranging the feed or fire place door within the trunk or mouth piece to the fire pot or place, and so as to operate as specified.

And in combination with the mouth piece, and the door arranged in it as specified, I claim the passage in the mouth piece and its plate, c, for the thin sheet or stratum of air to pass under the door, while it is wholly closed, and said plate, c, and be heated by contact with the plate before it, the said air, reaches the fuel.

And in combination with the inclined door of the fire place, the plate, c, and the air passage directly under it, I claim the ledge or flange, a', arranged as described, the same being not only for the purpose of regulating the admission of air into the passage, but of keeping it from passing under the door and over the plate, c, while the ledge is below the level of the top surface of the plate.

I also claim the arrangement of the register hole (viz., in line of or axially with respect to the shaft of the grate), in combination with the arrangement of the outer end of said shaft, viz., entirely within the throat of the ash pit, or in rear of the registry plate or opening as specified, the said arrangement not only enabling me to dispose the grate shaft entirely within the ash pit mouth (the end of said shaft, when projecting from the front face of the furnace, being, generally speaking, more or less in the way, besides presenting an appearance often disagreeable to the eye), but to make the registry opening answer the purpose not only of admitting air to the fire when required, but of enabling a person to place a key or crank upon the shaft for the purpose of turning or moving the grate when necessary, and this without danger of ashes escaping out of the ash pit, provided its door be closed.

I also claim the combination of a fire pot, a dome surmounting it, a series of flues (leading from the base or lower part of the dome), the whole being substantially as hereinbefore described.

I also claim the combination of a fire pot, a dome surmounting it, a series of flues (leading from the base or lower part of the dome), and a series of conical or partially conical bases or semi cones, serving not only to facilitate the entrance of smoke and heat into the conical radiators or flues, but the absorption of heat and its radiation toward the floor, and its reflection into the tapering radiators, the whole being substantially as specified.

I also claim the combination of a fire pot, a dome surmounting it or placed over it, a series of flues (leading from the base or lower part of the dome), and a hollow ring or annual radiator placed on and opening out of the said flues, the whole being substantially as hereinbefore explained.

NEW PUBLICATIONS.

A MANUAL OF PRACTICAL ASSAYING. By John Mitchell, F.C.S. Third Edition. Edited by Wm. Crookes, F.R.S., etc. London: Longmans, Green & Co., 1868.

We are indebted to the publishers for a copy of the above work, the merits of which have been thoroughly recognized by scientific men. The present edition contains all the important discoveries necessary to bring it completely up to the requirements of modern assaying, special attention having been paid to the Volumetric and Colorimetric Assays, as well as to the blowpipe assays. The portion of the work devoted to the subject of oil and gas-blast furnaces is of great value. The work has been carefully and ably edited, and is printed in clear bold type. It is the best, in fact the only complete English work upon the subject. The old nomenclature has been retained, but as the work is written rather for practical assayers than as a text book, this is hardly a defect. It would be difficult find any fault with the book, still more so to suggest any improvement.

RECEIPTS.—When money is paid at the office for subscriptions, a receipt for it will be given, but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona-fide* acknowledgment of their funds.

CITY SUBSCRIBERS.—The SCIENTIFIC AMERICAN will be delivered in every part of the city at $4 a year. Single copies for sale at all the News Stands in this city, Brooklyn, Jersey City, and Williamsburg, and by most of the News Dealers in the United States.

Advertisements.

The value of the SCIENTIFIC AMERICAN *as an advertising medium cannot be over-estimated. Its circulation is ten times greater than that of any similar journal now published. It goes into all the States and Territories, and is read in all the principal libraries and reading rooms of the world. We invite the attention of those who wish to make their business known to the annexed rates. A business man wants something more than to see his advertisement in a printed newspaper. He wants circulation. If it is worth 25 cents per line to advertise in a paper of three thousand circulation, it is worth $2.50 per line to advertise in one of thirty thousand.*

RATES OF ADVERTISING.

Back Page.....$1.00 *a line.*
Inside Page.....75 *cents a line.*

Engravings may head advertisements at the same rate per line, by measurement, as the letter press.

SITUATION WANTED—By an Engineer to superintend a Manufactory, or conduct sale of machinery. Address "R.," Box 2963, New York. 1*

HUTCHINSON & LAURENCE, 8 Dey st., Dealers in every description of Iron and Woodworking Machinery. 18 4

FOR LIGHT GRAY IRON CASTINGS, either Plain or Fancy. Finishing and Japanning of same. Also, Patterns of Wood or Metal. Address BRISTOL FOUNDERY CO., Bristol, Conn. 18 4

A 1ST-CLASS Mechanical Draftsman and Practical Engineer desires a permanent engagement. Experienced in Steam and Manufacturing Machinery, ordering work, etc. Willing to leave the city. W. A., 121 E. 12th st., New York.

GET THE BEST.—The Novelty Job Printing Press, for Amateurs, Druggists, Merchants, Descriptive circulars, & specimens of work mailed free. C. C. Thurston & Co., Brooklyn, N.Y. 18 2eow

TO SOAP MANUFACTURERS.—Prof H Dussauce, Chemist, is ready to furnish the most recent European processes to manufacture soaps and lyes of every description. Address New Lebanon, N. Y. 18 2*

T. N. HICKCOX & CO., 280 Pearl st., New York, Manufacture Stamped Brass Goods, Plain & Fancy, Brass Labels, Baggage and Key Checks, Patent Brass Mucilage Caps, Stamping and Cutting Dies, Gold Business Cards, etc. Special attention paid to new patent goods. Factory 240, 242, and 244 Wyckoff st., Brooklyn. 1*

Holiday Journal, New

No.—Free.—For the Holidays of 1868-9, containing a Christmas Story, Parlor Plays, Magic Sports, Odd Tricks, Queer Experiments, Problems, Puzzles, etc. 16 large pages, Illustrated. Sent Free. Address ADAMS & CO., 18 2eow Publishers, 25 Bromfield st., Boston, Mass.

Boiler for Sale.

A DINSMORE'S PATENT BOILER, of about 50 Horse Power, nearly New, and in perfect order, will be sold very low (if applied for at once), to give place to a larger one. Enquire of SEYMOUR, MORGAN & ALLEN, Brockport, N.Y., or WOODBURY, BOOTH & CO., Rochester, N. Y. 18 3

Organ Blowing

BY WATER POWER. For Engraving and Description of Apparatus invented M. Stannard, for the above use, address PRATT, WHITNEY & CO., Hartford, Conn., Manufacturers of First-class Machinists' Tools, Gun Machinery, Hydraulic Engines, and Special Machinery. 18 3

You Want Martha!

THE Most Valuable, Hardy Wine Grape yet known. A seedling from the Concord, and as perfectly hardy, healthy and vigorous as that variety, and ripens 10 days earlier. Quality best, both for table and wine. A splendid Grape in all respects. Send stamps for Illustrated Catalogues of over 50 varieties Grapes and small fruits, to GEO. W. CAMPBELL, Delaware, Ohio.

SEND FOR BAIRD'S CATALOGUE OF Practical & Scientific Books POSTAGE FREE. H. C. BAIRD INDUSTRIAL PUBLISHER 406 WALNUT ST. PHILADELPHIA, PA.

18 4

Getty's Pat. Pipe Cutter

THIS Cutter works easy, rolls down the burr edge, and is confidently recommended to Gas and Steam Fitters as the best in the market.
No 1 cuts from 1-8 in. to ¾ in. Price.....$ 8.
No 2 " 2-in. to 4½ in. Price.....$10.

GETTY'S PATENT PROVING PUMP & GAGE. This new Pump and Gage has been thoroughly tested, and gives general satisfaction. There is no glass or mercury used, and the Gage is so compact it can be carried in the Pocket.
Pump and Gage.....$25. Gage alone.....$13.
Address McNAB & HARLIN, Manufacturers of Brass Goods and Iron Fittings, 86 John st., New York. 18 12

SHINGLE & HEADING MACHINE.—Law's Patent. The simplest and best in use. Shingle Heading, and Stave Jointers, Stave Cutters, Equalizers, Heading Turners, Planers, etc. Address TREVOR & CO. Lockport, N. Y. 17 tf

WOODWORTH PLANERS A SPECIALTY—From new patterns of the most approved style and workmanship Wood-working Machinery generally. Nos. 24 and 26 Central, corner Union street, Worcester, Mass. 16 tf WITHERBY RUGG & RICHARDSON.

MODELS, PATTERNS, EXPERIMENTAL, and other Machinery, Models for the Patent Office, built to order by HOLSKE MACHINE CO., Nos 528, 530, and 532 Water st. cor. Jefferson. Refer to SCIENTIFIC AMERICAN office. 4 tf

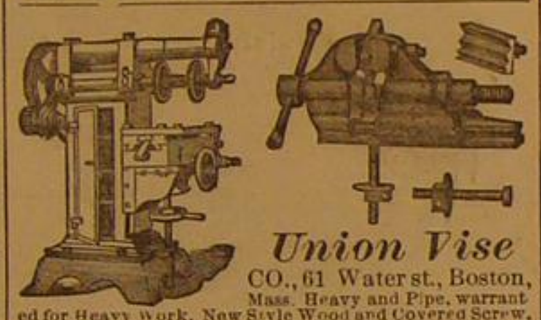
Sault's Patent

FRICTIONLESS Locomotive Valves, easily applied; requires no renewals. 12 tf M. & T. SAULT COMPANY, New Haven, Conn

WHEELER & WILSON
625 BROADWAY,
NEW YORK.
1,000 BUTTON-HOLE A DAY
MAKING BUTTON-HOLE ATTACHMENT
FOR
FAMILIES
AND
MANUFACTURERS.
18 2

WATCHES.---$500.

I WILL CHEERFULLY GIVE THE above amount to any one who can surpass my imitation of Gold Watches. Description of metal and goods sent free on demand. Prices from $16 to $22. They are sent, C.O.D. with charges. Address JULES D. BUGUENIN VUILLEMIN, No. 41 Nassau st., New York. Call and examine for yourselves. 18 eow



Union Vise

CO., 61 Water st., Boston, Mass. Heavy and Pipe, warranted for Heavy Work. New Style Wood and Covered Screw. Milling Machines, simple, great capacity, two sizes 2,300 and 950 lbs. G. H. NOTT, President. A. H. BRAINARD, Superintendent. 10 13* tf

FIRE EXTINGUISHER
ALWAYS READY FOR INSTANT use. Indorsed by the Government, the entire *Insurance Companies* and all Chiefs of Fire Departments. It has saved over 500 buildings in various parts of the country. Every house should have it. Price $45, No. 1; $50 No. 2; $55, No 3. Send for circular,
U. S. FIRE EXTINGUISHER CO.,
8 Dey street, New York, or
95 Water street, Boston, Mass.
11 8

IMPORTANT
TO OWNERS OF
Steam Boilers.

THE METROPOLITAN LOCK VALVE CO., of the City of New York, Manufacturers of the

CELEBRATED DOUBLE SEATED LOCK SAFETY VALVE.

This Valve is adopted and recommended by the U. S. Government, and by Inspectors-in-Chief and Deputies of several States, as filling all the requirements of the laws in relation to Steam Boilers, and as being superior to any other. It costs the same as the single disc valve, and has nearly double the capacity, therefore it is much cheaper. Endorsed by the highest engineering talent of the country.

For further particulars address

JOHN ASHCROFT,
Treas. and Supt.
50 & 52 John St., New York

16 4

LATHE CHUCKS—HORTON'S PATENT—from 4 to 36 inches. Also for car wheels Address E. HORTON & SON, Windsor Locks, Conn. 6 13* tf

POWER LOOMS. Improved Drop Box, Spooling, Winding, Beaming, Dyeing and Sizing Machines, Self-Acting Wool Scouring Machines, Hydra Extractors. Also, Shafting, Pulleys, and Self Oiling Adjustable Hangers, manuf'd by THOS. WOOD, 2106 Wood st., Phil'a, Pa. 9 13

PORTABLE STEAM ENGINES, COMbining the maximum of efficiency, durability, and economy with the minimum of weight and price. They are widely and favorably known, more than 600 being in use. All warranted satisfactory or no sale. Descriptive circulars sent on application. Address C. HOADLEY & CO. Lawrence, Mass. 1 tf

WINCHESTER
Repeating Rifles,
FIRING TWO SHOTS A SECOND,
AS A REPEATER, AND
TWENTY SHOTS A MINUTE
AS A SINGLE BREECH-LOADER.

These powerful, accurate, and wonderfully effective weapons, carrying eighteen charges, which can be fired in nine seconds, are now ready for the market, and are for sale by all responsible Gun Dealers throughout the country. For full information send for circular and pamphlets to the WINCHESTER REPEATING ARMS CO., 18 13 New Haven, Conn.

TUBE WELLS.—The Champion Well of The World.—Horner's Patent. Orders received from England and South America. State, County, and Township Rights sold. Warranted to operate where others fail. Address, 13 13* W. T. HORNER, Buffalo, N. Y.

PAGE'S GREAT WATER FLAME Coal, Patented Lime Kiln will burn No. 1 finishing lime with any coal or wood, mixed or separate, in same kiln. Rights for sale by C. D. PAGE, Rochester, N. Y. 24 26*

LE COUNT'S PATent Hollow Lathe Dogs and Clamps.—A set of 8 dogs from ⅜ to 2-in., inclusive, $8. A set of 12 from ⅜ to 4-in., $17 50. Five sizes Machinists' Clamps, from 2 to 6 in., inclusive, $11. Send for Circular.
C. W. LECOUNT.
South Norwalk, 12 tf eow Conn.

IMPORTANT.—MOST VALUABLE MAchine for planing, irregular and straight work, in wood, is the Variety Molding and Planing Machine, for all branches of wood working. Our improved guards make it safe to operate. Combination collars for cutters save one hundred per cent. For planing, molding, and cutting irregular forms, the machine is unsurpassed.

We hear there are manufacturers infringing on our eight patents on this machine. We caution the public against purchasing such.

All communications must be addressed to COMBINATION MOLDING AND PLANING MACHINE CO., P. O. Box 3,230, New York city.

Our machines we warrant. Send for descriptive pamphlet. Agents solicited. 2tf eow

VERY IMPORTANT.

THE WHOLE FOUNDATION OF THE OLD VARIETY MOLDING MACHINE, built at New York, is the GEAR PATENT, extended Sept. 30, 1867. The C. M. and P. Machine Company own ONLY A VERY LITTLE OF THE PATENT, outside of the State of New York. The owners, and Attorneys for owners, of the GEAR PATENT, and *sole* manufacturers of the best improved machines made for planing and molding straight and irregular forms in wood, perfectly safe to operate, with improved Feed Table, and improved adjustable collars for combination cutters, saveing 100 per cent for all the rest of the United States are
A. S. GEAR, JOHN GEAR & CO.,
New Haven, Conn., and Concord, N. H.
☞ *We Warrant our Machines and Caution the Public to Buy Machines of Lawful Owners* ONLY.
☞ We are Sole Manufacturers of the only **practicable** Guards invented. They can be attached to any Machine.
☞ Send for a Descriptive Pamphlet. 10 eow tf

MANUFACTURERS—And others using Steam Engines, can, by applying the INDICATOR, ascertain the condition of their Engines; the power required to do their work, or any portion thereof; the economy of fuel expended, when compared with power developed. The undersigned makes a specialty of this branch of engineering, and will wait on any party who desires his services. Instruments furnished and instruction given. F. W. BACON, 18 tfeow Consulting Engineer, 84 John st., N. Y.

Machine-made Watches
By the
TREMONT WATCH COMPANY,
BOSTON, MASS.
The Cheapest Reliable Watch. Their Watches are dust proof, and all have their best Chronometer Balance. For sale by all respectable dealers. 10 13eow*

MERRICK & SONS,
Southwark Foundery,
No. 430 Washington Avenue, Philadelphia.
William Wright's Patent
VARIABLE CUT-OFF STEAM ENGINE,
Regulated by the Governor.
Merrick's SAFETY HOISTING MACHINE,
Patented June, 1868. DAVID JOY'S PATENT
VALVELESS STEAM HAMMER.
D. M. Weston's Patent
Self-Centering, Self-Balancing Centrifugal Sugar-Draining Machine.
AND
HYDRO EXTRACTOR
For Cotton and Woolen Manufacturers.
10 eow tf New York Office, 62 Broadway.

MASON'S PATENT FRICTION CLUTCHES, for starting Machinery, especially Heavy Machinery, without sudden shock or jar, are manufactured by V. W. MASON & CO., Providence, R. I. Also, TAPLIN, RICE & CO., Akron, Ohio. 2 monthly]

WOODWORTH PLANERS—IRON Frames 18 to 34 inches wide. $125 to $150. 2 tf b S. C. HILLS, 12 Platt st., New York.

Priest's Ready Solder.

The only Patent issued. All persons are cautioned against infringements. Samples sent on receipt of 25 cents. For sale everywhere. Agents wanted. Sole proprietors, W. W. BEAUCHAMP & CO., No. 40 Hanover st., Boston Mass. 11 tf

Bridesburg Manf'g Co.,
Office No. 65 North Front Street,
PHILADELPHIA, Pa.,
Manufacture all kinds of Cotton and Woolen Machinery including their new
Self-Acting Mules and Looms.
Of the most approved style. Plan drawn and estimates furnished for factories of any size. Shafting and mill gearing made to order 9 f13*

OIL! OIL!! OIL!!!

FIRST PREMIUM.....PARIS, 1867
Grand Silver Medal and Diploma!
WORLD'S FAIR—London, 1862.
TWO PRIZE MEDALS AWARDED
PEASE'S IMPROVED OILS!
Engine, Signal, Lard, and Premium Petroleum is the Best Made for
Railroads, Steamers, and for Machinery and Burning.
F. S. PEASE, Oil Manufacturer,
Nos. 61 and 63 Main street, Buffalo, N. Y.
N B.—Reliable orders filled for any part of the world. 1 tf

U. S. PATENT OFFICE, Washington, D. C., Oct 19th, 1868.
Newell A. Prince, Simsbury, Conn. having petitioned for the extension of the patent granted him on the 23d day of January, 1855, for an improvement in "Fountain Pen," it is ordered that said petition be heard at this office on the 28th day of December next.
Any person may oppose this extension. Objections, depositions, and other papers should be filed in this office twenty days before the day of hearing.
18 3 S. H. HODGES, Acting Commissioner of Patents.

U. S. PATENT OFFICE, Washington, D. C., Oct. 7 1868.
Fanny Holmes, of Whitehall, N. Y., executrix of the estate of John E. Newcomb, deceased, having petitioned for the extension of a patent granted the said John E. Newcomb on the 9th day of January, 1855, for an improvement in "Grain Harvesters," it is ordered that said petition be heard at this office on the 14th day of December next.
Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.
18 3 S. H. HODGES, Acting Commissioner of Patents.

U. S. PATENT OFFICE, Washington, D. C., Oct., 26, 1868.
Marshall Burnett and Charles Vander Woerd, Boston, Mass., having petitioned for an extension of a patent granted them on the 2d day of January, 1855, for an improvement in "Grain and Grass Harvesters," it is ordered that said petition be heard at this office on the 14th day of December next.
Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing
17 3 S. H. HODGES, Acting Commissioner of Patents.

U. S. PATENT OFFICE, Washington, D. C., Oct 3, 1868.
Lysander Wright, of Newark, N. J., having petitioned for the extension of a patent granted him on the 2d day of January, 1855, for an improvement in "Sawing Machine," it is ordered that said petition be heard at this office on the 14th day of December next.
Any person may oppose this extension. Objections, depositions, and other papers should be filed in this office twenty days before the day of hearing.
17 3 S. H. HODGES, Acting Commissioner of Patents

U. S. PATENT OFFICE, Washington, D. C., Oct 26, 1868.
Ambrose Foster, of Laurasville, Md., for himself and the representatives of J. A. Messenger, deceased, having petitioned for an extension of the patent granted the said Ambrose Foster, on the 16th day of January, 1855, for an improvement in "Building Blocks," it is ordered that the said petition be heard at this office on the 21st day December next.
Any person may oppose this extension. Objections, depositions, and other papers should be filed in this office twenty days before the day of hearing.
17 3 S. H. HODGES, Acting Commissioner of Patents.

U. S. PATENT OFFICE, Washington, D. C., Sept. 12, 1868.
Martin P. M. Cassity, of Granada, Kansas, administrator of the estate of Isaac H. Steer, deceased, having petitioned for an extension of the patent granted to Henry Carter, assignee of said Steer, the 19th day of June, 1855, antedated the 19th day of December, 1854, for an improvement in "Making Nuts," it is ordered that said petition be heard at this office on the 12th day of December next.
Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.
17 3 S. H. HODGES, Acting Commissioner of Patents.

U. S. PATENT OFFICE, Washington, D. C., Sept 24, 1868.
P. W. Mackenzie, of Orangeville, N. Y., having petitioned for an extension of the patent granted him on the 2d day of January, 1855, for an improvement in "Machine for Blowing Blasts" etc., it is ordered that said petition be heard at this office on the 14th day of December next.
Any person may oppose this extension. Objections, depositions, and other papers should be filed in this office twenty days before the day of hearing.
16 3 S. H. HODGES, Acting Commissioner of Patents.

U. S. PATENT OFFICE, Washington, D. C., Sept. 26, 1868.
Allen B. Wilson, of Waterbury, Conn., having petitioned for an extension of the patent granted to him on the 19th day of December, 1854, for an improvement in "Sewing Machines," it is ordered that said petition be heard at this office on the 7th day of December next.
Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.
16 3 S. H. HODGES Acting Commissioner of Patents.

U. S. PATENT OFFICE, Washington, D. C., Sept. 26, 1868.
Jesse W. Hatch and Henry Churchill, of Rochester, N. Y., having petitioned for an extension of the patent granted to them on the 2d day of January, 1855, and reissued on the 24th day of July, 1866, for an improvement in "Machines for Cutting Boot and Shoe Soles," it is ordered that said petition be heard at this office on the 14th day of December next.
Any person may oppose this extension. Objections, depositions, and other papers should be filed in this office twenty days before the day of hearing
16 3 S. H. HODGES, Acting Commissioner of Patents.

U. S. PATENT OFFICE, Washington, D. C., Sept. 30, 1868.
Anton Smith, of Girard, Ill., having petitioned for an extension of the patent granted him on the 16th day of Jan., 1855, for an improvement in "Plows," it is ordered that said petition be heard at this office on the 21st day of December next.
Any person may oppose this extension. Objections, depositions, and other papers, should be filed at this office twenty days before the day of hearing.
16 3 S. H. HODGES, Acting Commissioner of Patents

U. S. PATENT OFFICE, Washington, D. C., Sept. 21, 1868.
Hannah M. Brown, of Woonsocket, R. I., administratrix of the estate of Joan E. Brown, deceased, and W. E. Barrett, of Providence, R. I., executor of the estate of Stephen S. Bartlett, deceased, having petitioned for the extension of a patent granted to the said John E. Brown and Stephen S. Bartlett, on the 2d day of Jan., 1855; reissued Jan. 1st, 1861, and again reissued Feb. 25, 1862, in three divisions, numbered respectively 1281, 1282, and 1283, for an improvement in "Grain and Grass Harvesters," it is ordered that said petition be heard at this office on the 14th day of December next.
Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.
16 3 S. H. HODGES, Acting Commissioner of Patents.

RICHARDSON, MERIAM & CO., Manufacturers of the latest improved Patent Daniels' and Woodworth Planing Machines, Matching, Sash and Molding, Tenoning, Mortising, Boring, Shaping, Vertical and Circular Re-sawing Machines, Saw Mills, Saw Arbors, Scroll Saws, Railway, Cut off, and Rip Saw Machines, Spoke and Wood Turning Lathes, and various other kinds of Wood-working machinery. Catalogues and price lists sent on application. Manufactory, Worcester, Mass. Warehouse, 107 Liberty st., New York. 11 8*

AZURENE
CONCENTRATED INDIGO
For the Laundry.—Free from Oxalic Acid.—See Chemist's Certificate.
A Patent Pocket Pincushion or Emery Bag
IN EACH TWENTY CENT BOX.
For Sale by all respectable Grocers and Druggists.
14 13

STEAM HAMMERS TURN-TABLES, and Foundery Cranes. Address GREENLEAF & CO., Indianapolis, Ind. 14 tf

Zur Beachtung für deutsche Erfinder!

Nach dem neuen Patentgesetze können Deutsche unter denselben Bedingungen wie Bürger der Vereinigten Staaten, ihre Erfindungen sich durch Patente sichern.

Die Patentgesetze nebst den Regeln und Instructionen der Patentoffice und anderer nützlichen Informationen werden perfrei an Alle gegen Erlegung von 25 Cents versandt. Patente für neue Erfindungen werden von uns in den Ver. Staaten, sowie in Europa pünktlich besorgt.

Man adressire
Munn & Co.,
37 Park Row, N. Y.

PATENT CLAIMS.—Persons desiring the claim of any invention, patented within thirty years, can obtain a copy by addressing a note to this office, giving name of patentee and date of patent, when known, and inclosing $1 as a fee for copying. We can also furnish a sketch of any patented machine to accompany the claim, at a reasonable additional cost. Address MUNN & CO. Patent Solicitors, No. 37 Park Row New York.

Advertisements.

Advertisements will be admitted on this page at the rate of $1 per line. Engravings may head advertisements at the same rate per line, by measurement, as the letter press.

PATTERN LETTERS to put on Patterns for Castings, etc. KNIGHT BROS., Seneca Falls, N.Y. 1 50*

$150 PER MONTH.—Agents Wanted in every Town and County in the United States, for an entirely new business. Please make no engagements until you send for particulars. 18 os J. B. MASSEY, St. Louis, Mo.

R. A. BELDEN & CO., Manufacturers of Machinists' Tools, Iron Planers of improved patterns and designs, Crank Planers and Shaping Machines, Engine Lathes, Screw Machines, Milling Machines, and Gun Machinery. Also, Special Machinery, improved Nut and Bolt Machinery, Trip Hammers, Models, Dies, etc., etc 18 3 1os 2is 208 Orange st., New Haven, Conn.

Waltham Watches.

For a few months past we have advertised the above Watches at *extremely low prices*, and the result has been most satisfactory. Our plan has been to sell the genuine **WALTHAM WATCHES**, in Solid Gold or Silver Case only, and at a very small profit; giving the purchaser every opportunity of examination and comparison, and with the understanding that if the Watch does not prove satisfactory, it can be exchanged or the money refunded.

These Watches are, without exception, the most perfect specimens of fine mechanism ever produced in any country. Each and every part is made by machinery of the most delicate and elaborate construction.

Compared with foreign watches, they possess many advantages, excelling not only in principle and finish, but still more in their reliability as time-keepers. As an indication of the prices we submit the following:

Silver Hunting Watches	$18
Gold Hunting Watches, 18 Karat Cases	80
Gold Hunting Watches, Ladies' size	70

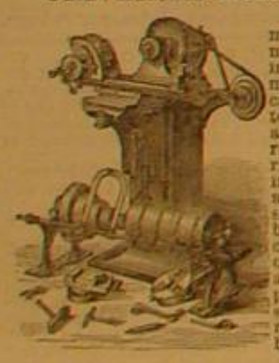
We often receive orders direct from our advertisement, but prefer that every one should send first for our descriptive price list, which explains all the different kinds, tells the weight and quality of the cases, and gives prices of each. This we will forward to any one on application, and it will be found very useful in making a selection.

Every Watch is Warranted by Special Certificate from the American Watch Company.

We will send them by Express to any address, allow the purchaser to open the package and examine the Watch before paying, and if, afterward, it does not prove satisfactory, it can be exchanged or the money will be *cheerfully* refunded. Please state that you saw this in the Scientific American. Address in full,

HOWARD & CO.,
18 1os No. 619 Broadway, N. Y.

UNIVERSAL MILLING MACHINE.



This machine has all the movements of a plain milling machine, and the following in addition:—the carriage moves and is fed automatically, not only at right angles to the spindle, but at any angle, and can be stopped at required point. On the carriage, centers are arranged in which rimers, drills, and mills can be cut, either straight or spiral. Spur and beveled gears can also be cut. The head which holds one center can be raised to any angle, and conical blanks pisced on an arbor in it, cut straight or spiralling. Either right or left-hand spirals can be cut.

BROWN & SHARPE MF'G CO., Providence, R. I.
16 3os eow

HICKS' Improved CUT-OFF ENGINE, AND Non-Explosive Circulating Boiler

Cannot be equaled for correctness of principle, economy in operation, perfection of workmanship, and cheapness of price. W. C. HICKS, 85 Liberty st., New York. 15 os eow

FREE. Our New Catalogue of Improved STENCIL DIES. More than $200 A MONTH is being made with them S. M. SPENCER & CO., Brattleboro, Vt. 1 tf

WIRE ROPE.

Manufactured by
JOHN A. ROEBLING
Trenton, N. J.

FOR Inclined Planes, Standing Ship Rigging, Bridges, Ferries, Stays or Guys on Derricks and Cranes, Tiller Ropes, Sash Cords of Copper and Iron, Lightning Conductors of Copper. Special attention given to hoisting rope of all kinds for Mines and Elevators. Apply for circular, giving price and other information. 14 os tf

CAP & Set Screws as perfect as Engine-cut Screws. Address S. C. SMITH, Lowell, Mass. 13 70s*

SPOOLS FOR COTTON AND SILK, made by H. H. FRARY, Jonesville, Vt. 11 80s*

WHEATON'S OINTMENT cures the Itch. WHEATON'S OINTMENT will cure Salt Rheum. WHEATON'S OINTMENT cures Old Sores. WHEATON'S OINTMENT cures all diseases of the Skin. Price 50 cents;—by mail 60 cents. All Druggists sell it. WEEKS & POTTER, Boston, Proprietors. 1 15* os

IRON PLANERS, ENGINE LATHES, Drills, and other Machinists' Tools, of Superior Quality, on hand and finishing. For Sale Low. For Description and Price, address NEW HAVEN MANUFACTURING CO., New Haven. 15 tf os

$2000 A Year and Expenses to Agents to introduce the Wilson Sewing Machine. Stitch alike on both sides. Sample on 2 weeks trial. Extra inducements to experienced agents. For further particulars, address the Wilson Sewing Machine Co., Cleveland, Ohio; Boston, Mass.; or St. Louis, Mo. 16 8 os

ROOT'S WROUGHT IRON SECTIONAL
SAFETY BOILER

Has no large sheet-iron shell to explode; is tested to 300 lbs.; economical and durable. Also, ROOT'S Trunk Engines. Vertical and Horizontal Engines, all descriptions. Steam Pumps, Machinery, etc. Send for pamphlets and price lists. Agents wanted. JOHN B. ROOT, 11 13os Nos. 95 and 97 Liberty st., near Broadway.

SELF-ACTING WEATHER STRIP FOR Doors and Windows.—Patented June 4th, 1867.—The latest and best. No cutting or defacing doors; prevents rattling of windows; never gets out of order; will wear longer than any other strip in market. State and County Rights for sale. Send for circular to 17 os 2 BUTLER & WARING, Patentees, Hudson, N.Y.

Ames Iron Works,

Oswewo, N. Y.,
FOR SALE OR TO RENT.

THE Long continued ill health of the proprietor makes mental relaxation necessary. These works employ about One Hundred men, are eligibly situated, and have a good business established, and to a man of some means and good ability this is a rare chance. Terms easy. H. M. AMES. 17 4os*

CARVALHO'S
Steam Super Heater

SAVES Fuel, and furnishes Dry Steam, Invaluable to Manufacturers of Paper, Cotton, and Woolen Goods, Soap, Glue, Enameled Cloth, etc., in Dye and Print Works, or for Power. Address HENRY W. BULKLEY, Engineer, 70 Broadway, N. Y. 16 4os

CATALOGUES SENT FREE.
MATHEMATICAL INSTRUMENTS, 112 pages.
OPTICAL INSTRUMENTS, 72 pages.
MAGIC LANTERNS and STEREOPTICONS, 100 pp.
PHILOSOPHICAL INSTRUMENTS, 84 pages.
JAMES W. QUEEN & CO.,
16 4os* 924 Chestnut st., Philadelphia, Pa.

KIDDER'S PASTILLES—A Sure Relief for Asthma. STOWELL & CO., Charlestown, Mass. 15 6os*

BEFORE BUYING WATER WHEELS, See, or send for description of Pressure Turbine, made by PEEKSKILL MAN'F'G CO., Peekskill, N. Y. 11 13os*

Ready Roofing

THE FIRST CUSTOMER IN EACH place can buy 1000 feet for $30, about half price. Samples and circulars sent by mail. Ready Roofing Co., 81 Maiden Lane, New York. 12 tf os

Pressure Blowers

OF ALL SIZES, for purposes where a blast is required. For particulars and circulars, address B. F. STURTEVANT, No. 72 Sudbury st., Boston, Mass. 16 tf os

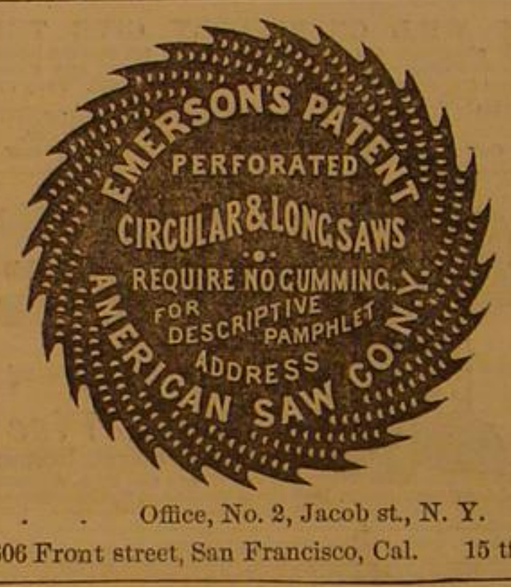
THE INDICATOR APPLIED to Steam Engines. Instruments furnished and Instruction given. F. W. BACON, 1 tf 84 John st., New York.

WOODWARD'S COUNTRY HOMES. 150 Designs, $1 50, postpaid, GEO. E. WOODWARD, Architect, 191 Broadway, N. Y. Send stamp for catalogue of all new books on Architecture. 9 ostf

DO YOU WANT GAS

WE can afford to pipe your house, or pay for your fixtures, or both, and leave them as your property if we cannot put up a Machine that shall be perfectly satisfactory under any and every condition. Circulars and information. UNION GAS CO., 1 os tf 14 Dey st., New York.

TWIST DRILLS, FLUTED HAND REAMERS, exact to Whitworth's gage, and Beach's Patent Self Centering Chuck, manufactured by Morse Twist Drill and Machine Co., New Bedford, Mass. 9 ostf



Factory, Trenton, N. J. . . . . Office, No. 2, Jacob st., N. Y.
Branch Office for Pacific coast, No. 606 Front street, San Francisco, Cal. 15 tf

Reynolds'

TURBINE WATER WHEELS.
And all kinds of
MILL MACHINERY.
Send for New Illustrated Pamphlet for 1868.
GEORGE TALLCOT,
15 os 13* 96 Liberty st., New York.

EAGLE ANVILS and PARALLEL CHAIN VISES.

Manufactured ONLY by
{15 26os*} FISHER & NORRIS, Trenton, N. J

WM. D. ANDREWS & BROTHER,
414 Water st., New York, Manufacture
Patent Smoke-burning & superheating Boilers that are safe. DRINAGE and WRECKING PUMPS, to pass large bodies of water, Sand, and Gravel. HOISTING MACHINES, Friction Grooved and Noiseless, or with Gearing. OSCILLATING ENGINES, from half to two hundred and fifty horse power. All of these Machines are Light, Compact, Durable, and Economical. 13 18os

NEW AND IMPROVED BOLT CUTTER—Schlenker's Patent.—The Best in use. Cutting Square, Coach Screw and V-Thread by once passing over the iron. Cutter Heads can be attached to other Machines, or the ordinary Lathe. Taps furnished to order. Circular price list, with references, mailed on application. 15 tf R. L. HOWARD, Buffalo, N. Y.

TALLOW LUBRICATORS and a General assortment of Brass Work, of superior quality at low prices, at Cincinnati Brass Works. 13 tf F. LUNKENHEIMER, Prop.

POCKET REPEATING LIGHT.—A neat little self-lighting pocket instrument, with Improved Tape Matches, giving instantly a clear beautiful flame by simply turning a thumb piece, and can be lighted fifty times in succession without filing. A sample instrument, filled with the inflammable tape, with circular and list of prices, sent by mail on receipt of 65 cents. Address 17 tf REPEATING LIGHT CO., Springfield, Mass.

TODD & RAFFERTY, Manufacturers and DEALERS IN MACHINERY. Works, Paterson, N. J.; Warerooms, 4 Dey st., N. Y., Boilers, Steam Pumps, Machinists' Tools. Also, Flax, Hemp, Rope & Oakum Machinery; Snow's & Judson's Governor's; Wright's Patent Variable Cut-off and other Engines. tf 1

Sheet and Roll Brass,

BRASS AND COPPER WIRE,
German Silver, etc.,
Manufactured by the
THOMAS MANUFACTURING CO.,
Thomaston, Conn.
☞ Special attention to particular sizes and widths for Type Founders, Machinists, etc. 23 26*

CHARLES A. SEELY, CONSULTING and Analytical Chemist, No. 26 Pine street, New York. Assays and Analyses of all kinds. Advice, Instruction, Reports etc., on the useful arts. 1 t

PATENT
Steam Brick Dryer.

The subscriber, having obtained Letters Patent for an improved brick drying apparatus, and believe d to be the best and most economical dryer yet offered to the public, now offers for sale, upon favorable terms, State, County, and Single Rights. Apply to I. C. HATCH, Camden, N. J.

This is to certify that the Steam Brick Drying Kiln of Isaac C. Hatch is now in sucessful operation at our works, doing, in my opinion, all he claims for it. The bricks, afterbeing burnt, are strong and sound. A. REEVES, 16 4 "Pea Shore Steam Brick Works."

ALLEN PATENT ANTI-LAMINA Will Remove and Prevent Scale in Steam Boilers, now used in Tubular, Cylinder, and the Harrison Boilers. It has never failed. Price $5 per can. ALLEN & NEEDLES, 15 5* 41 South Water st., Philadelphia.

SECOND-HAND
Machinery and Boilers
FOR SALE.

One	25-H. P.	Corliss Engine.
Three	30-H. P.,	Slide Valve, do.
One	100-H. P.,	Hewes & Phillips, do.
One	25-H. P.	Locomotive Boiler.
Three	30-H. P.	Tubular do.
Two	30-H. P.	Flue do.
One	45-H. P.	do. do.
One	60-H. P.	Engine with Flue, Boilers, and Complete fixtures, at Milwaukee, Wisconsin.

All the above are in complete order, and will be sold very low for cash. Address WASHINGTON IRON WORKS, New Burgh, N. Y. New York city office 57 Liberty st. 17 4

BUERK'S WATCHMAN'S TIME DETECTOR.—Important for all large Corporations and Manufacturing concerns—capable of controlling with the utmost accuracy the motion of a watchman or patrolman, as the same reaches different stations of his beat. Send for a Circular. J. R. BUERK, P. O. Box 1,057, Boston, Mass.

N. B.—This detector is covered by two U. S. patents. Parties using or selling these instruments without authority from me will be dealt with according to law. 15 tf

FOR Twist Drills, Reamers, Chucks, and Dogs, address Am. Twist Drill Co., Woonsocket, R.I. 11 tf

Harrison's Grain Mills

WITH A VARIETY OF BOLTERS, Elevators, Smut Machines, and Corn Crackers For Sale. EDWARD HARRISON, New Haven, Conn. 15 tf

WOODBURY'S PATENT
Planing and Matching

and Moulding Machines, Gray & Woods Planers, Self-oiling Saw Arbors, and other wood-working machinery. Send for Circulars 485 Liberty street, N. Y.; S. A. WOODS, 107 Sudbury street, Boston. 11 13*

R. BALL & CO., Worcester, Mass., Manufacturers of the latest improved patent Daniels', Woodworth's, and Gray & Wood's Planers, Sash Molding, Tenoning, Power and Foot Mortising, Upright and Vertical Shaping and Boring Machines, Scroll Saws, Double Saw Bench, Re-Sawing, and a variety of other machines for working wood. Also, the best Patent Hub and Rail-car Mortising Machines in the world. Send for our illustrated catalogue. 13 tf

SETS, VOLUMES AND NUMBERS. Entire sets, volumes and numbers of Scientific American (Old and New Series) can be supplied by addressing A. B. C., Box No. 773, care of MUNN & CO., New York.

The Harrison Boiler.

THIS IS THE ONLY REALLY SAFE BOILER in the market, and can now be furnished at a *GREATLY REDUCED COST*. Boilers of any size ready for delivery. For circulars, plans, etc., apply to HARRISON BOILER WORKS,

Philadelphia, Pa.; J. B. Hyde, Agent, 119 Broadway New York; or, to John A. Coleman, Agent, 53 Kilby st., Boston, Mass. 6 tfos 13*

STOCKS, DIES, AND SCREW PLATES, Horton's and other Chucks. JOHN ASHCROFT, 50 John st., New York. 16 13

WROUGHT-Iron Pipe for Steam, Gas and Water; Brass Globe Valves and Stop Cocks, Iron Fittings, etc. JOHN ASHCROFT, 50 John st., N. Y. 16 13

SILICATE OF SODA AND POTASH, for Sweetening hard water in cisterns and wells; also for protecting wood and making cements water and fire-proof. For sale by the sole manufacturers, L. & J. W. FEUCHTWANGER, 16 4 55 Cedar st., New York.

NOTICE TO STEEL, GLASS, and Patent Dryer Manufacturers.—Peroxide of Manganese, over 90 per cent, and Tungsten or Wolfram ore, in crystals or powder, for sale by the importers, L. & J. W. FEUCHTWANGER, 16 4 55 Cedar st., New York.

ASHCROFT'S LOW WATER DETECTOR will insure your Boiler against explosion. JOHN ASHCROFT, 50 John st., New York. 16 13

FOR STEAM ENGINES BOILERS, SAW Mills, Cotton Gins, address the ALBERTSON AND DOUGLASS MACHINE CO., New London, Conn. 1 tf

EMPLOYMENT.—$15 to $30 a day guaranteed. Male or Female Agents wanted in every town—descriptive circulars free. Address 15 13* JAMES C. RAND & CO., Biddeford, Me.

HOTCHKISS ATMOSPHERIC FORGE Hammer. Will forge a 3-inch bar. Fine Machine. For Sale. EDWARD HARRISON, New Haven, Conn. 15 tf

ROBERT McCALVEY, Manufacturer of HOISTING MACHINES AND DUMB WAITERS. 15 13 602 Cherry st., Philadelphia, Pa.

B. E. LEHMAN, MANUFACTURER OF brass and iron body globe valves and cocks, gage cocks, oil cups, steam whistles. Special attention paid to heavy iron body valves for furnaces and rolling mills. Send for price list to B. E. LEHMAN, 12 9 Lehigh Valley Brass Works, Bethlehem, Pa.

STEAM AND WATER GAGES, STEAM Whistles, Gage Cocks, and Engineer's Supplies. 16 13 JOHN ASHCROFT, 50 John st., New York.

STEAM ENGINE FOR SALE—16-inch cylinder by 3½ feet stroke, has two flue boilers and steam pump, pipes and appurtenances, as it is now running in thorough working order. Apply to CHARLES W. COPELAND, 17 2 171 Broadway, New York.

BOILER FELTING SAVES TWENTY-five per cent of Fuel. JOHN ASHCROFT, 16 13 50 John st., New York.

LARGE LOT OF TOOLS FOR SALE. COMPRISING all that are necessary for a heavy machine shop; second-hand, in good order, with shafting, etc. Also, several Milling, Slabbing, and Screw Machines, Vises, Drills, and small tools, new and in perfect order. Address HORACE McMURTRIE & CO., 17 3 80 Milk street, Boston, Mass.

Lucius W. Pond,

IRON and Wood-working Machinery, Machinists' Tools and supplies, Shafting, Mill Gearing, and Jobbing. Also, Sole Manufacturer of TAFT'S CELEBRATED PUNCHES & SHEARS, (Works at Worcester, Mass.) 98 Liberty st., New York. 14 tf

CAMDEN
Tool and Tube Works,

CAMDEN, N. J. Manufacturers of WROUGHT IRON Welded Tube for Steam, Gas, and Water, and all the most Improved Tools for Screwing, Cutting, and Fitting Tube by Hand or Steam Power. Sole Manufacturers of Peace's Patent Adjustable Pipe Tongs, Clean-cutting Pipe Cutter. Also, Gas-pipe Screwing Stocks, polished. No. 1 Stock Screws ¼, ⅜, ½, ¾ Tube, price complete, with dies, $10. No. 2, do., 1, 1¼, 1½, 2 do., do., $20. No. 3 do., both screws and cuts off, 2½, 3, 3½, 4, do., do., $65. 11 13*

$10 A Day for all. Stencil tool, samples free. Address A. J. FULLAM, Springfield, Vt. 7 13

1868.

SCIENTIFIC AMERICAN.

Established 1845.

The **SCIENTIFIC AMERICAN** is published every week, and is the largest and most widely circulated journal of its class now pulished in this country. Each number is Illustrated with **Original Engravings**, representing New Inventions in Mechanics, Agriculture, Chemistry, Manufactures, Steam and Mechanical Engineering, Photography, Science, and Art; also, Tools and Household Utensils. TWO VOLUMES with COPIOUS INDEXES, are published each year, commencing January 1st, and July 1st. **Terms**:—One Year, **$3**; Half-Year, **$1 50**; Clubs of Ten Copies for One Year, **$25**; Specimen Copies sent gratis.

Address

MUNN & CO.,
37 Park Row, New York.

☞ The Publishers of the **Scientific American**, in connection with the publication of the paper, have acted as **Solicitors of Patents** for **twenty-two years. Thirty Thousand** Applications for Patents have been made through their Agency. More than **One Hundred Thousand Inventors** have sought the counsel of the Proprietors of the **SCIENTIFIC AMERICAN** concerning their inventions. Consultations and advice to inventors, by mail, free. Pamphlets concerning Patent Laws of all Countries, free.

☞ **A Handsome Bound Volume**, containing **150** Mechanical Engravings, and the United States Census by Counties, with Hints and Receipts for Mechanics, mailed on receipt of **25c.**

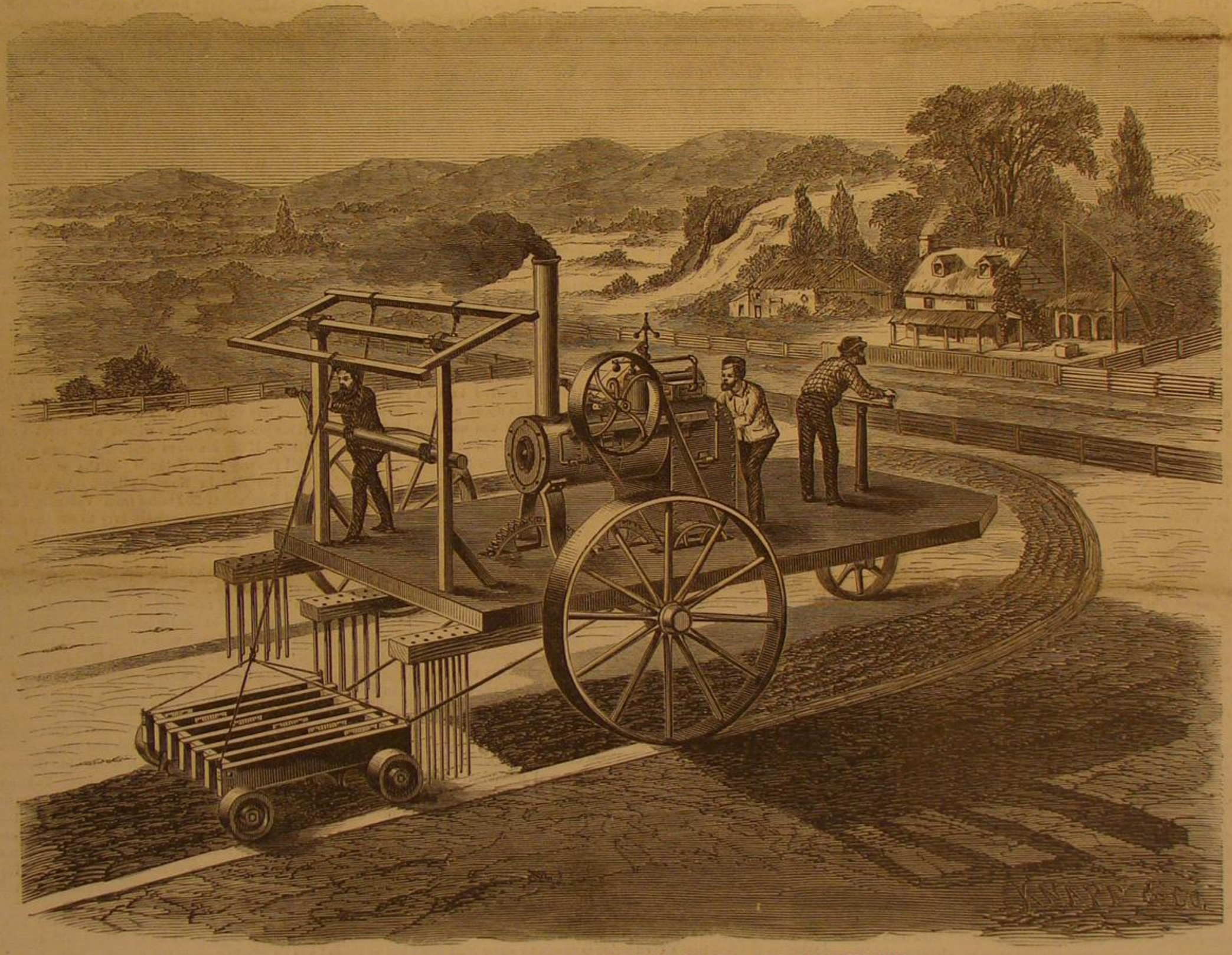
SCIENTIFIC AMERICAN

A WEEKLY JOURNAL OF PRACTICAL INFORMATION, ART, SCIENCE, MECHANICS, CHEMISTRY, AND MANUFACTURES

Vol. XIX.—No. 19. [NEW SERIES.] NEW YORK, NOVEMBER 4, 1868. $3 per Annum [IN ADVANCE.]

Improved Traction Engine and Steam Plow.

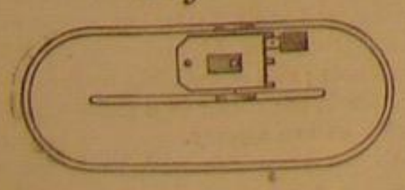
Many attempts have been made in England and in this country to adapt steam to the arduous labor of plowing, but none of them have as yet been so successful as to insure the general adoption of any one system, although, under favorable circumstances, some good results have been attained. The plan of employing stationary engines located on the borders of a field, and drawing, by ropes or chains, a plow or a gang of plows across from side to side, is cumbersome, costly, and not very satisfactory. The traction engine is unwieldy, and not adapted to loose soil or yielding surfaces.



DELAVIGNE'S PATENT STEAM PLOW AND CULTIVATOR.

The peculiar feature of the machine shown in the accompanying engravings is, that it forms its own roadway, which it always travels in the successive operations of plowing, harrowing, and cultivating. The large engraving exhibits the machine in operation It

Fig. 2



is a platform 26 feet long by 15 or more wide, supported mainly on two wheels, 9 feet in diameter, with tires 15 inches wide. There is a steering wheel in front operated by a lever or hand wheel. The platform supports an ordinary portable engine and boiler, connected by suitable gearing to the propelling wheels. The gearing is so calculated, relatively to the number of revolutions of the engines, as to propel the machine forward at a rate of about 150 feet per minute, which rate may be increased or diminished by the change of a pinion. It is designed that the machine shall always travel on the same road or track in going forward and back over the field, so as always to have a firm road for the machine to travel upon, in the various operations of plowing, harrowing, seeding, cultivating, reaping, etc. For harrowing or cultivating, the whole space is taken in once passing, the cultivators being so arranged as to pass between the rows, the wheels being high enough for the machine to go over the crop until it is quite tall.

The main shaft, on which the driving wheels are fixed, is in three sections, the middle one turning in bearings near either end, and connected with two short sections which carry the wheels. The connections are made by sleeve couplings, either on square shafts or round shafts feathered. The object of this arrangement is to allow either wheel to be uncoupled in turning corners, so that the track of the inner wheel shall be a straight line, the wheel turning as a pivot, while the traveling wheel describes the curve. The plan is shown plainly in fig. 2. It will be seen, that after being plowed, the field lies in beds, 15 feet wide, with the path or track of 15 inches between each bed undisturbed.

The plows are seen in the gang, Fig. 3; the harrow, in Fig. 4; and the cultivator in Fig. 5. Either of these is attached to the machine by rods or chains, and can be elevated or depressed, as occasion may require, to pass over roads or uncultivated portions of the field, or to adapt them to work at any depth, according to the nature of the soil, by means of the hoisting appendage seen in Fig. 1, at the rear of the machine. A group of rods—Fig. 1—extend from the platform in advance of the plowshares for the protection of the growing plants, to prevent them from being injured by the deposition of the soil by the plows. It is evident, that in addition to the work of cultivation, this machine may also be used as a power to drive thrashing machines, saws, and to perform other labor required on the farm or plantation.

Fig. 3

Fig. 4

Fig. 5

Patented March 31, 1868, by John C. Delavigne, who may be addressed at New Orleans, La; or application may be made to E. E. Tiffany & Co., 15 Wall st., New York city.

A BRILLIANT meteor was observed in London on the night of October 7. It lasted about five seconds. Everything was as clear as day, the cathedral and houses at the northwest corner of Cannon street standing out in bold relief against a brilliant sky. The lights in the gas lamps were for the time invisible.

"ON A PIECE OF CHALK."—A LECTURE TO WORKING-MEN.

BY PROFESSOR HUXLEY, F. R. S., ETC.

If a well were to be sunk at our feet in the midst of the city of Norwich, the diggers would very soon find themselves at work in that white substance, almost too soft to be called rock, with which we are all familiar, as "chalk."

Not only here, but over the whole country of Norfolk, the well-sinker might carry his shaft down many hundred feet without coming to the end of the chalk; and, on the sea coast, where the waves have pared away the face of the land which breasts them, the scarped faces of the high cliffs are often wholly formed of the same material. Northward, the chalk may be followed as far as Yorkshire; on the south coast it appears abruptly in the picturesque western bays of Dorset, and breaks into the Needles of the Isle of Wight; while on the shores of Kent it supplies that long line of white cliffs to which England owes her name of Albion.

Were the thin soil which covers it all washed away, a curved band of white chalk, here broader and there narrower, might be followed diagonally across England from Lulworth in Dorset to Flamborough Head in Yorkshire, a distance of over 280 miles as the crow flies.

From this band to the North Sea on the east and the Channel on the south, the chalk is largely hidden by other deposits; but, except in the Weald of Kent and Sussex, it enters into the very foundation of all the southeastern counties.

Attaining, as it does in some places, a thickness of more than a thousand feet, the English chalk must be admitted to be a mass of considerable magnitude. Nevertheless, it covers but an insignificant portion of the whole area occupied by the chalk formation of the globe, which has precisely the same general character as ours, and is found in detached patches, some less and others more extensive than the English.

Chalk occurs in northwest Ireland; it stretches over a large part of France,—the chalk which underlies Paris being, in fact, a continuation of that of the London basin; runs through Denmark and Central Europe, and extends southward to North Africa; while eastward it appears in the Crimea and in Syria, and may be traced as far as the shores of the Sea of Aral in Central Asia.

If all the points at which true chalk occurs were circumscribed, they would lie within an irregular oval about 3,000 miles in long diameter,—the area of which would be as great as that of Europe, and would many times exceed that of the largest existing inland sea,—the Mediterranean.

Thus the chalk is no unimportant element in the masonry of the earth's crust, and it impresses a peculiar stamp, varying with the conditions to which it is exposed, on the scenery of the districts in which it occurs. The undulating downs and rounded coombs, covered with sweet grassed turf, of our inland chalk country, have a peacefully domestic and mutton-suggesting prettiness, but can hardly be called either grand or beautiful. But on our southern coasts, the wall-sided cliffs, many hundred feet high, with vast needles and pinnacles standing out in the sea, sharp and solitary enough to serve as perches for the wary cormorant, confer a wonderful beauty and grandeur upon the chalk headlands. And in the East, chalk has its share in the formation of some of the most venerable of mountain ranges, such as the Lebanon.

What is this wide-spread component of the surface of the earth and whence did it come?

You may think this no very hopeful inquiry. You may not unnaturally suppose that the attempt to solve such problems as these can lead to no result save that of entangling the inquirer in vague speculations, incapable alike of refutation and of verification.

If such were really the case, I should have selected some other subject than a "piece of chalk" for my discourse. But, in truth, after much deliberation, I have been unable to think of any topic which would so well enable me to lead you to see how solid is the foundation upon which some of the most startling conclusions of physical science rest.

A great chapter of the history of the world is written in the chalk. Few passages in the history of man can be supported by such an overwhelming mass of direct and indirect evidence as that which testifies to the truth of the fragment of the history of the globe, which I hope to enable you to read with your own eyes to-night.

Let me add, that few chapters of human history have a more profound significance for ourselves. I weigh my words well when I assert, that the man who should know the true history of the bit of chalk which every carpenter carries about in his breeches pocket, though ignorant of all other history, is likely, if he will think his knowledge out to its ultimate results, to have a truer, and therefore a better, conception of this wonderful universe, and of man's relation to it, than the most learned student who is deep read in the records of humanity and ignorant of those of nature. The language of the chalk is not hard to learn, not nearly so hard as Latin, if you only want to get at the broad features of the story it has to tell; and I propose that we now set to work to spell that story out together.

We all know that if we "burn" chalk the result is quicklime. Chalk, in fact, is a compound of carbonic acid gas and lime, and when you make it very hot the carbonic acid flies away and the lime is left.

By this method of procedure we see the lime, but we do not see the carbonic acid. If, on the other hand, you were to powder a little chalk, and drop it into a good deal of strong vinegar, there would be a great bubbling and fizzing, and finally a clear liquid in which no sign of chalk would appear. Here you see the carbonic acid in the bubbles; the lime, dissolved in vinegar, vanishes from sight. There are a great many other ways of showing that chalk is essentially nothing but carbonic acid and quicklime. Chemists enunciate the result of all the experiments which prove this, by stating that chalk is almost wholly composed of "carbonate of lime."

It is desirable for us to start from the knowledge of this fact, though it may not seem to help us very far towards what we seek, for carbonate of lime is a widely spread substance, and is met with under very various conditions. All sorts of limestones are composed of more or less pure carbonate of lime. The crust, which is often deposited by waters which have drained through limestone rocks in the form of what are called stalagmites and stalactites, is carbonate of lime. Or, to take a more familiar example, the fur on the inside of a tea kettle is carbonate of lime; and, for anything chemistry tells us to the contrary, the chalk might be a kind of gigantic fur upon the bottom of the earth-kettle, which is kept pretty hot below.

Let us try another method of making the chalk tell its own history. To the unassisted eye chalk looks simply like a very loose and open kind of stone. But it is possible to grind a slice of chalk down so thin that you can see through it,—until it is thin enough, in fact, to be examined with any magnifying power that may be thought desirable. A thin slice of the fur of a kettle might be made in the same way. If it were examined microscopically, it would show itself to be a more or less distinctly laminated mineral substance, and nothing more.

But the slice of chalk presents a totally different appearance when placed under the microscope. The general mass of it is made up of very minute granules; but embedded in this matrix are innumerable bodies, some smaller and some larger, but, on a rough average not more than a hundredth of an inch in diameter, having a well-defined shape and structure. A cubic inch of some specimens of chalk may contain hundreds of thousands of these bodies, compacted together with incalculable millions of the granules.

The examination of a transparent slice gives a good notion of the manner in which the components of the chalk are arranged, and of their relative proportions. But, by rubbing up some chalk with a brush in water, and then pouring off the milky fluid, so as to obtain sediments of different degrees of fineness, the granules and the minute rounded bodies may be pretty well separated from one another, and submitted to microscopic examination, either as opaque or as transparent objects. By combining the views obtained in these various methods, each of the rounded bodies may be proved to be a beautifully constructed calcareous fabric, made up of a number of chambers, communicating freely with one another. The chambered bodies are of various forms. One of the commonest is something like a badly grown raspberry, being formed of a number of nearly globular chambers of different sizes congregated together. It is called *Globigerina*, and some specimens of chalk consist of little else than *Globigerinæ* and granules.

Let us fix our attention upon the *Globigerina*. It is the the spoor of the game we are tracking. If we can learn what it is, and what are the conditions of its existence, we shall see our way to the origin and past history of the chalk.

A suggestion which may naturally enough present itself is, that these curious bodies are the result of some process of aggregation which has taken place in the carbonate of lime; that, just as in winter, the rime on our windows simulates the most delicate and elegantly arborescent foliage,—proving that the mere mineral, water, may, under certain conditions, assume the outward form of organic bodies,—so this mineral substance, carbonate of lime, hidden away in the bowels of the earth, has taken the shape of these chambered bodies. I am not raising a merely fanciful and unreal objection. Very learned men, in former days, have even entertained the notion that all the formed things found in rocks are of this nature; and if no such conception is at present held to be admissible, it is because long and varied experience has now shown that mineral matter never does assume the form and structure we find in fossils. If any one were to try to persuade you that an oyster shell (which is also chiefly composed of carbonate of lime) had crystallized out of sea-water, I suppose you would laugh at the absurdity. Your laughter would be justified by the fact that all experience tends to show that oyster shells are formed by the agency of oysters, and in no other way. And if there were no better reasons, we should be justified, on like grounds, in believing that *Globigerina* is not the product of anything but vital activity.

Happily, however, better evidence in proof of the organic nature of the *Globigerinæ* than that of analogy is forthcoming. It so happens that calcareous skeletons, exactly similar to the *Globigerinæ* of the chalk, are being formed, at the present moment, by minute living creatures, which flourish in multitudes, literally more numerous than the sands of the sea shore, over a large extent of that part of the earth's surface which is covered by the ocean.

The history of the discovery of these living *Globigerinæ*, and of the part which they play in rock-building, is singular enough. It is a discovery which, like others of no less scientific importance, has arisen, incidentally, out of work devoted to very different and exceedingly practical interests.

When men first took to the sea they speedily learned to look out for shoals and rocks, and, the more the burden of their ships increased, the more imperatively necessary it became for sailors to ascertain with precision the depth of the waters they traversed. Out of this necessity grew the use of the lead and sound line; and, ultimately, marine surveying, which is the recording of the form of coasts and of the depth of the sea, ascertained by the sounding lead upon charts.

At the same time it became desirable to ascertain and to indicate the nature of the sea bottom, since this circumstance greatly affects its goodness as holding ground for anchors. Some ingenious tar, whose name deserves a better fate than the oblivion into which it has fallen, attained this object by arming the bottom of the lead with a lump of grease to which more or less of the sand or mud or broken shells, as the case might be, adhered, and was brought to the surface. But, however well adapted such an apparatus might be for rough nautical purposes, scientific accuracy could not be expected from the armed lead, and to remedy its defects (especially when applied to sounding in great depths), Lieutenant Brooke, of the American Navy, some years ago invented a most ingenious machine by which a considerable portion of the superficial layer of the sea bottom can be scooped up and brought up from any depth to which the lead descends.

In 1853, Lieutenant Brooke obtained mud from the bottom of the North Atlantic, between Newfoundland and the Azores at a depth of more than 10,000 feet, or two miles, by the help of this sounding apparatus. The specimens were sent for examination to Ehrenberg of Berlin, and to Bailey of West Point, and those able microscopists found that this deep sea mud was almost entirely composed of the skeletons of living organism,—the greater proportions of these being just like the *Globigerinæ* already known to occur in the chalk.

Thus far the work had been carried on simply in the interests of science, but Lieutenant Brooke's method of sounding acquired a high commercial value when the enterprise of laying down the telegraph cable between this country and the United States was undertaken. For it became a matter of immense importance to know, not only the depth of the sea over the whole line along which the cable was to be laid, but the exact nature of the bottom, so as to guard against chances of cutting or fraying the strands of that costly rope. The Admiralty consequently ordered Captain Dayman, an old friend and shipmate of mine, to ascertain the depth over the whole line of the cable, and to bring back specimens of the bottom. In former days such a command as this might have sounded very much like one of the impossible things which the young prince in the Fairy Tales is ordered to do before he can obtain the hand of the princess. However, in the months of June and July, 1857, my friend performed the task assigned to him with great expedition and precision, without, so far as I know, having met with any reward of that kind. The specimens of Atlantic mud which he procured were sent to me, to be examined and reported upon.

The result of all these operations is that we know the contours and nature of the surface-soil covered by the North Atlantic for a distance of 1,700 miles from east to west, as well as we know that of any part of the dry land.

It is a prodigious plain, one of the widest and most even plains in the world. If the sea were drained off, you might drive a wagon all the way from Valentia, on the west coast of Ireland, to Trinity Bay in Newfoundland. And, except upon one sharp incline, about 200 miles from Valentia, I am not quite sure that it would even be necessary to put the skid on, so gentle are the ascents and descents upon that long route. From Valentia the road would lie down hill for about 200 miles to the point at which the bottom is now covered by 1,700 fathoms of sea-water. Then would come the central plain, more than a thousand miles wide, the inequalities of the surface of which would be hardly perceptible, though the depth of the water upon it now varies from 10,000 to 15,000 feet; and there are places in which Mont Blanc might be sunk without showing its peak above water. Beyond this, the ascent on the American side commences, and gradually leads, for about 300 miles, to the Newfoundland shore.

Almost the whole of the bottom of this central plain (which extends for many hundred miles in a north and south direction) is covered by a fine mud, which when brought to the surface, dries into a grayish-white friable substance. You can write with this on a blackboard, if you are so inclined, and to the eye it is quite like very soft, grayish chalk. Examined chemically, it proved to be composed almost wholly of carbonate of lime; and if you make a section of it in the same way as that of a piece of chalk was made, and view it with the microscope, it presents innumerable *Globigerinæ* embedded in a grannular matrix.

Thus this deep sea mud is substantially chalk. I say substantially, because there are a good many minor differences; but as these have no bearing upon the question immediately before us—which is the nature of the *Globigerinæ* of the chalk—it is unnecessary to speak of them.

Globigerinæ of every size, from the smallest to the largest, are associated together in the Atlantic mud, and the chambers of many are filled by a soft animal matter. This soft substance, is, in fact, the remains of the creature to which the *Globigerinæ* shell, or rather skeleton, owes its existence,—and which is an animal of the simplest imaginable description. It is, in fact, a mere particle of living jelly, without defined parts of any kind,—without a mouth, nerves, muscles, or distinct organs, and only manifesting its vitality to ordinary observation by thrusting out and retracting, from all parts of its surface, long filamentous processes, which serve for arms and legs. Yet this amorphous particle, devoid of everything which in the higher animals we call organs, is capable of feeding, growing, and multiplying; of separating from the ocean the small proportion of carbonate of lime which is dissolved in sea-water; and of building up that substance into a skeleton for itself, according to a pattern which can be imitated by no other known agency.

The notion that animals can live and flourish in the sea at the vast depths from which apparently living *Globigerinæ* have been brought up does not agree very well with our usual conception respecting the conditions of animal life; and it is not so absolutely impossible as it might at first sight appear to be, that the *Globigerinæ* of the Atlantic sea-bottom do not live and die where they are found.

As I have mentioned, the soundings from the great Atlantic plain are almost entirely made up of *Globigerinæ* with the

granules which have been mentioned and some few other calcareous shells; but a small percentage of the chalky mud—perhaps at most some five per cent of it—is of a different nature, and consists of shells and skeletons composed of silex or pure flint These silicious bodies belong partly to those lowly vegetable organisms which are called *Diatomaceæ*, and partly to those minute and extremely simple animals termed *Radiolariæ*. It is quite certain that these creatures do not live at the bottom of the ocean but at its surface,—where they may be obtained in prodigious numbers by the use of a properly constructed net. Hence it follows that these silicious organisms, though they are not heavier than the lightest dust, must have fallen in some cases through fifteen thousand feet of water before they reached their final resting place on the ocean floor. And considering how large a surface these bodies expose in proportion to their weight, it is probable that they occupy a great length of time in making their burial journey from the surface of the Atlantic to the bottom.

But if the *Radiolariæ* and Diatoms are thus rained upon the bottom of the sea from the superficial layer of its waters, in which they pass their lives, it is obviously possible that the *Globigerinæ* may be similarly derived; and, if they were so, it would be much more easy to understand how they obtain their supply of food than it is at present. Nevertheless the negative and positive evidence points the other way. The skeletons of a full-grown deep sea *Globigerinæ* are so remarkably solid and heavy in proportion to their surface as to seem little fitted for floating; and, as a matter of fact, they are not to be found along with the Diatoms and *Radiolariæ* in the uppermost stratum of the open ocean.

It has been observed again, that the abundance of *Globigerinæ* in proportion to other organisms of like kind, increases with the depth of the sea; and that deep-water *Globigerinæ* are larger than those which live in shallower parts of the sea; and such facts negative the supposition that these organisms have been swept by currents from the shallows into the deeps of the Atlantic.

It therefore seems to be hardly doubtful that these wonderful creatures live and die at the depths in which they are found.

However, the important points for us are that the living *Globigerinæ* are exclusively marine animals, the skeletons of which abound at the bottom of deep seas; and that there is not a shadow of reason for believing that the habits of the *Globigerinæ* of the chalk differed from those of the existing species. But if this be true, there is no escaping the conclusion that the chalk itself is the dried mud of an ancient deep sea.

(To be continued.)

ICE MACHINES.

(Continued from page 196.)

Since publishing the former article, a pamphlet has appeared in Germany containing a short description of the modern ice machines, in which, however, the American inventions and improvements, as usually is the case with European publications, are totally overlooked. We possess here a decided avantage over Europe, in the fact that Americans always keep themselves posted about European inventions and improvements, while Europe has not yet come fully to the persuasion of the great importance of our inventions and improvements, and how useful it would be, always to take due notice of them.

We see from the German pamphlet referred to, that five different forms of the machine described by us, have been patented in Europe, the first by Vranken in Cologne and Meller in Essen, a second by Grubeaud, a third by Penant, a fourth by Fouju, and a fifth by Toselli. None of them possess any striking peculiarity or advantage, their differences being of the same mechanical kind as in the different cream freezers so well known in this country, and on which there exist several scores of United States patents. In general they all resemble our cream freezers, of which many could be used for ice machines of this description; perhaps some of them have already been patented in this country as such.

We will only add a few more freezing mixtures to our list, page 196:

MIXTURES.	PARTS.	DESCENT OF THERMOMETER.
Carbonate of Soda	1	70° Fah.
Nitrate of Potash	1	
Water	1	
Chloride of Ammonium	1	65°
Water	1	
Sulphate of Soda	3	70°
Water	2	
Nitrate of Ammonia	1	50°
Water	1	

As these mixtures are made simply with water, and not with acids, the ingredients may be regained by evaporation and recrystallization of the salts, and therefore they are much less expensive than the solutions in acids, mentioned on page 196. It is curious that also here heat must be employed in order to return to the salts their cold-producing qualities, and in this sense the chemical ice machines described are related to those of the second class to be described next week, which operate entirely and solely by the previous application of heat.

The different makers of these machines recommend special solutions, according to the amount of success they obtained with them, in their machines. So the chloride of ammonium, saltpeter, and water (page 194) is recommended by Vranken; by Grubeaud, nitrate of ammonia, and water (see above); Penant recommends hydrated glauber salts and muriatic acid (hydrated sulphate of soda and hydrochloric acid); Toselli recommends crystallized soda and ammoniacal salt (he means probably carbonate of soda and nitrate of ammonia, or chloride of ammonium, or sulphate of ammonia, which are cheaper than the nitrate of ammonia.)

In order to be successful in these manipulations, they must be made with as large quantities as possible, the different salts must be well powdered, and, as well as the liquids used, be cooled before hand as much as practicable, the mixing of the ingredients must be done as rapidly as possible, and great care taken that no heat can be absorbed anywhere, except from the water to be cooled or frozen.

One more point must be observed in relation to this method of producing cold. When the salts are too dry, no cold will be produced, even heat, as in place of liquefaction, at first a solidification of water in the salt will take place, which of course in solidifying will set its latent heat of fluidity free, the same as takes place in pouring water on quicklime, which is anhydrous lime. This is illustrated in the cooling method of Berzelius, described on page 196. When the chloride of calcium* is too dry, as is the case with the fused anhydrous substance, it will commence with absorbing water, and solidifying it, to form first a hydrate. The heat thus produced in some portions, may counterbalance to a considerable extent the cold produced by other dissolving particles; from there the prescription of Berzelius, to let the salt, by powdering it and passing it through a sieve, absorb water from the atmosphere, previously to using it.

*On page 196, lines 23 and 31, in mentioning chloride of lime, we intended not the hypochlorite of lime, or bleaching powder, which is commonly erroneously called chloride of lime, but we intended the above chloride of calcium, made from lime and hydrochloric acid.

Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents.

"What Makes the Difference?"

MESSRS EDITORS.—An article which appeared in the SCIENTIFIC AMERICAN, of Oct. 14th, commenting upon the difference in social position, pay, etc, of mechanics and clerks, does not seem to me to touch the real point of the subject discussed.

In the first place, labor, *per se*, is not degrading, nor is it generally considered so, but many men working as mechanics do not take the pains to qualify themselves for social position. They affect to despise the points of etiquette, and other things considered essential in society, and cry out against them. There is no reason why a man working only ten hours per day should not have abundant time to study and perfect himself in all the rules of conduct for the best society, as it is called, that is the society of educated and refined people.

A young man who takes a little care to learn, and practice the rules of good society, and read works of a character tending to elevate and improve his mind will find plenty of opportunities for associating with people of the so-called first circles. In the circle of my acquaintance I know of many persons, who started in life as working mechanics who are now leaders of society, and I know others, having abundant means, so far as bare money is concerned, to gratify every desire and move in the highest circles, who are content to grovel along without any social intercourse, so to speak. It is not wealth alone that gives the entrée to refined circles, but it is mind, and the attention to points of etiquette which have become established in the course of centuries of attrition among crowds of gentle-men and gentle-women, known in ordinary conversation as "gentlemen and ladies."

Now clerks in stores are selected for their gentlemanly style of behavior; it is an essential qualification for a clerk that he should be polite and well behaved, and it is on account of their having these qualifications that they are better received in society than mechanics. Let a mechanic however, qualify himself for society and study to make himself agreeable, as clerks are obliged to be, and he can have the entrée of as good society as the clerk, in fact, my experience is that the workingman or mechanic, has advantages in social intercourse above the mere clerk, because, as a general thing his mind is superior. The training his mind receives in learning a trade improves him in more ways than one, if he only aims for superiority.

A MECHANIC.

[Our correspondent falls into the error that there is a distinction generally made in favor of clerks over mechanics, in regard to their admittance into good society. We repeat that we know of no society in this country—beyond a select and exclusive class to which neither would be elligible under ordinary circumstances—that makes any such distinction.

We dissent from the opinion that the servile and puppyish manners acquired in the counter-jumper's profession are superior in any respect to the manly independence yet general courtesy of mechanics. We affirm that as a class mechanics are infinitely better informed, have better minds, better health, look better and feel better, live better, earn more money, and use it more wisely than clerks in dry goods and fancy goods stores. Of course we dont include every kind of clerks in our expressions of opinion, but we do believe, man was created for a nobler purpose than peddling dolls or attending milliners' shops.

Our correspondent has missed the entire drift of our article, if he failed to see that the difference which we alluded to was in favor of the bricklayer, as compared with the fancy goods clerk, in his manliness, his mental ability, and his courage, and that these qualifications, not his greater wages, were the true secret of his power when he "strikes" and the want of them the very reason why the fancy goods clerk, *is* a fancy goods clerk, and why he will always bow his neck to the yoke, and submit to the exactions of his employers.—EDS.

Center of Gravity.

MESSRS. EDITORS:—The difficulty with Mr. McCarroll, about the centers of gravity in revolving wheels, arises from the fact that he does not, or has not, considered the difference between gravity (which is an immutable principle) and centrifugal force, which is changeable—being a mechanical force and not a principle. Gravity has no motion, but is the same every instant of time; and, hence, a wheel cannot be put in such rapid motion as to change the center of gravity. If it could, then we could have perpetual motions. Gravity cannot be changed by mechanical force, hence nature will, in every case, find its own balance; and thus no such thing as a self-moving machine, or perpetual motion, can be brought into existence.

JOHN S. WILLIAMS.

Thermometers—How to Select.

MESSRS. EDITORS:—I have just purchased a thermometer, made by Sargent & Co., and, on comparing it with one of Kendall's thermometers, I find a uniform difference of two degrees between the two instruments. There must be an error somewhere; but where is it? It cannot be in the tubes, for the improbability of two tubes having the same imperfections—which must be the case, other things being equal—to give uniform results, amounts to almost a moral impossibility. It cannot be in the graduations, or in the scales, for the same reason. If there be an error in the graduation of one of the tubes, or one of the scales, there must be precisely the same error in the other tube or scale, to give a uniform difference of two degrees. It is possible that the discrepancy is due to such a combination of errors in the two instruments as exactly compensate for each other, and so give uniformity of action; but this is too improbable to merit a moment's attention. The fault must, then, be sought for in the adjustment of the tubes to the scales. By the aid of a microscope I find, upon the Kendall tube, certain scratches or file marks, evidently made by the graduator, corresponding to the figures on the scale—32, 60, 100, and 140.

On the Sargent tubes are similar marks, corresponding to figures 34, 62, and 92. As the file marks upon the former occur at the definite figures or landmarks—32 "Freezing point," 60 "Temperate," 100, and 140; while those upon the latter at 34, 62, and 92—I conclude that the Kendall tube is properly adjusted to the scale, and that the Sargent tube is raised two degrees too high—an error which cannot be corrected without taking the instrument apart, and enlarging the upper hole in the brass scale. If the above premises and deductions are well founded, the inference is that both the instruments are perfect in all their parts, with the single exception that one of them is imperfectly put together.

It is a notorious fact that hardly two cheap thermometers exactly agree at all temperatures; but by comparing one instrument with another, and noticing whether the difference in the hight of mercury, if any, is uniform, at different temperatures; whether the file marks, which can generally be found by sliding the point of a knife along the sides of the tube, occur at definite figures or landmarks, of which 32 will always be one, and whether a portion of the mercurial column, broken off by a slight jar, occupies equal or varying lengths in different parts of the tube, it is not difficult to ascertain where the error if any is, and whether it is remediable.

J. H. PARSONS.

Eating Clouds.

Dr. Livingston, relating his adventures on Lake Nyassa, thus tells one curiosity which he fell in with: During a portion of the year, the northern dwellers on the lake have a harvest which furnishes a singular kind of food. As we approached our limit in that direction, clouds, as of smoke arising from miles of burning grass, were observed bending in a southeasterly direction, and we thought that the unseen land in the opposite side was closing in, and that we were near the end of the lake. But next morning we sailed through one of the clouds in our own side, and discovered that it was neither smoke nor haze, but countless millions of minute midges called "kungo" (a cloud of fog). They filled the air to an immense hight, and swarm upon the water too light to sink in it. Eyes and mouth had to be closed while passing through this living cloud, they struck upon the face like fine drifting snow. Thousands lay in the boat after emerging from the clouds of midges. The people gathered these insects by night and boiled them into thick cakes, to be used as a relish—millions of midges in a cake. A kungo cake an inch thick, and as large as the blue bonnet of a Scotch plowman, was offered to us, it was very dark in color, and tasted not unlike caviare or salted locusts.

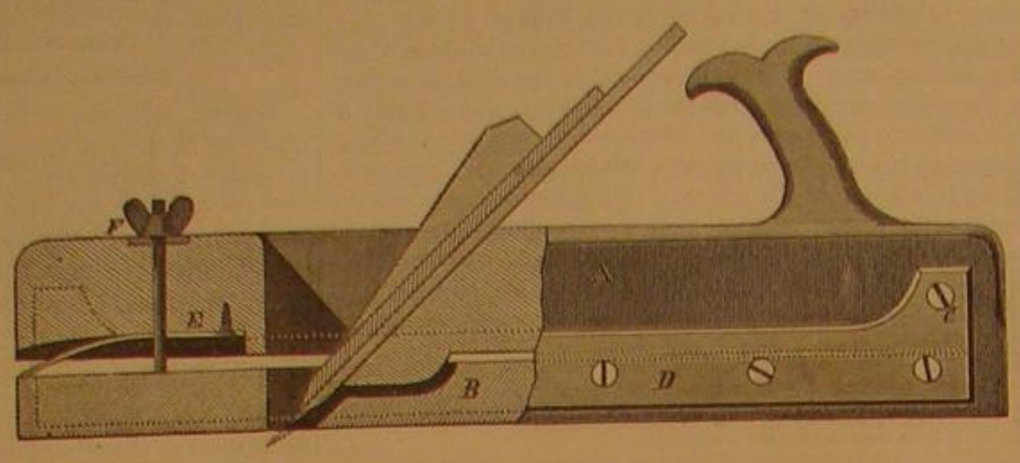
Presto Change.

The *Richmond News*, says a man in that city is manufacturing butter by a chemical process at the rate of one pound and nine ounces from one pint of milk and two eggs. It says: "We know that the statement seems improbable; we know that people will turn up their eyes incredulously, and say, 'it can't be done, it can't be good,' etc., but the proof of the pudding is in the eating. The operation is performed every morning at nine o'clock, and every evening before sales commence at Mr. Smith's auction room, in the presence of crowds; and doubters are invited to go and see the butter made, and see it weighed, and then to taste it before they pronounce the thing impossible. The butter can be made in any churn, crock, or jar."

We have not the least doubt of the truth of this statement. We have heard that a French cook will make plenty of good soup from pebbles, provided a sufficient allowance of other materials are incorporated. So in this case we see no reason to doubt that one pound and nine ounces of butter can be made from a pint of milk and two eggs, provided the chemical employed in the process be one pound and a little over eight ounces of butter.

Improvement in Joiners' Planes.

The objects of the invention shown in the accompanying engraving are to give a control over the thickness of the shaving and depth of the cut by the pressure of the hand, and to prevent the drag of the bit on the board when the plane is drawn back. The stock of the plane is made in two parts, the upper portion, A, which holds the bit, being pivoted to the lower part, B, at the rear end by a screw, C, passing through metal guide plates, D, on each side the plane. The front end of the upper portion is raised from the lower portion by means of a spring, E, which, when the pressure of the hand on the front of the plane is withdrawn, lifts the upper portion together with the bit or plane iron. The amount of this movement is governed by the thumb screw, F. From this description and the engraving, which is partly in section, the construction and advantages of this device may be plainly seen.



BUCKEL'S ADJUSTING PLANE.

Patented through the Scientific American Patent Agency, August 25, 1868, by George Buckel, who may be addressed at 17 Prospect street, Detroit, Mich.

THE PROTUBERANCES ON THE SUN.

Among the several scientific expeditions sent to the East by the European governments for the purpose of observing the late total eclipse of the sun, was a photographic company under the auspices of the North German States. This party was led by the distinguished scientist and photographer, Dr. Vogel, whose interesting contributions often appear in our paper. A new photometer, or instrument for indicating the actinic power of light at all hours of the day, has been lately patented in this country by him. Dr. Vogel has communicated to the Philadelphia *Photographer*, and also to the London *Photographic News*, some interesting particulars concerning his photographic eclipse experiences, among which are the following:

We were not spared the sufferings generally imposed on the traveler who passes through the Red Sea at the hot time of the year. This sea, inclosed on both sides by deserts, and connected with the Indian Ocean only by a very narrow channel, forms an isolated bay, where, in consequence of the customary calms and want of currents in the water, the temperature increases in the same degree as you advance toward the south. The perspiration flows down your body just as if you were in a steam bath; the whole of the skin is heated and irritated, and happy is he who finds a spot on deck where a slight breeze cools him for a moment. We were glad to reach the more airy ocean, and anchor near Aden on the 2d of August.

The aspect of this town is not in the least an agreeable one. You see a quite bare, savage mass of rocks, interrupted by some works of fortification, warehouses, shops, and coal sheds. The heat was supportable as long as we were not at work, but as soon as we began the slightest exertions the discomfort was very great.

At the day of the eclipse we rose at four o'clock in the morning. It was the task of the North German expedition to make a photographic view of the eclipse during its totality. For this purpose we had a long telescope with a lens of six inches, without difference of focus, and with a focal distance of six feet. This lens, constructed by Steinheil, afforded a solar image of three quarters of an inch in diameter, which was taken upon a photographic plate by means of an ordinary sliding chest for two images.

The totality of the eclipse at Aden was about three minutes long (in India five minutes); nevertheless, we had chosen Aden for our station because there were already photographic observers in India, and because the totality appeared at Aden about an hour earlier than in India. Therefore a comparison of the different results would enable us to decide the question, if the *protuberances* appearing at a total eclipse of the sun were changing in the course of time or not.

Our task was now to get within these three minutes as many views of the phenomenon as possible. For this purpose we had previously exercised ourselves in the employment of the photographic telescope, like artillerymen with their guns.

Dr. Fritsche prepared the plates in the first tent, Dr. Zenker put the sliding chests into the telescope, Dr. Thiell exposed, and I myself developed in the second tent.

We stated that it was possible in this way to get six images (three plates of two images) during three minutes.

When the decisive moment was fast advancing, the sky, hitherto covered with clouds, showed some openings, through which the sun, already covered partially by the moon, was to be seen. The landscape around was illuminated by the strangest light, a medium between moon and sun light.

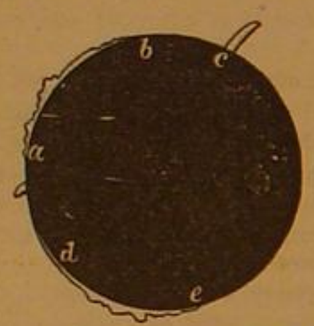
The chemical strength of light was exceedingly weak. A proof plate gave a wholly exposed image of the cloud after fifteen seconds. The sun cresent became smaller and smaller, and the opening in the clouds seemed to increase.

The last minutes before the totality (which began at twenty minutes past six o'clock) went rapidly away. Dr. Fritsche and myself crept into the tents, where we remained, consequently we have seen nothing of the totality. Our work began; we exposed the first plate five and ten seconds, in order to know what was the just time.

Muhammed, our black servant, brought the first attempt into my tent. I poured the iron developer over the plate, eager to know what was to come. At this moment my light was extinguished. I called for light, but nobody heard me, as all were about their task. I stretched my right hand out of the tent, holding the chest in the left, and happily caught a small oil lamp, which I had previously prepared. And now I saw the image of the sun appearing on the plate. The dark margin of the sun was surrounded by a series of peculiar elevations, the other side showed a strange hook; the phenomenon being exactly the same in both views. My joy was great, but there was no time for enjoyment. I soon received the second, and, after another minute, the third plate. "The sun is coming forth!" exclaimed Dr. Zenker. The totality was over. All this seemed to have been done in a moment.

When I developed the second plate I perceived only very weak traces of an image. The clouds had veiled the sun at the very moment of the exposure. The third plate gave two brilliant views, with protuberances at the lower margin. Glad to have reached so much, we washed, fixed, and varnished the plates, and immediately took some copies on glass, which were to be dispatched to Europe separately.

I here give you a design of the plate. Over the margin of the sun we see the protuberances, *a b*; on the opposite side we perceive the strange hook already mentioned. Its height was about one-fourteenth of the sun's diameter, and it would therefore in reality be 12,000 miles high. On the third plate we got the protuberances, *d e*, at the lower margin.



Great and Small—Microscopes.

A correspondent of the Boston *Journal of Chemistry* says:

"There is a curious principle (which may be perhaps called physiological) involved in the terms *great* and *small*. It is this: that one has no conception of magnitude except by comparison of one object with another; and no one has or can have any knowledge of the appearance of magnitude to any other one. That is, I cannot convey to you my idea of the size of any object except by comparing it with my idea of the size of some other object. If I say that a thing appears to me to be one inch long, I merely compare it with an inch rule; but I do not, cannot know, that an inch appears to you as long as a foot does to me, or the reverse. Again, when one looks at an object that is completely isolated (to the vision) from all other objects with which it might be compared, we form an idea of its magnitude entirely arbitrary. For example, the moon in a clear sky must present exactly the same apparent magnitude to every observer. This is determinable mathematically; yet it is notorious, that, of a dozen people who may be asked their idea of the moon's apparent size, no two may agree.

"This same fact comes out in the use of the microscope. Almost all novices in the use of that instrument ask what is the magnifying power, as if the answer to that covered the main value of the instrument, thinking that the more it magnifies the better it must be; when in fact power is a secondary consideration in the value of a microscope, great power of inferior quality being obtainable at very little cost, and that what is called the magnifying power is calculated from an arbitrary standard. The apparent size of any one object in the field of the microscope is by all observers governed by their estimate of the apparent diameter of the illuminated field in which the object is seen. There are modes of determining this by comparison with other objects, but as the instrument is generally used, nothing is presented to the eye but the 'field,' and no other object is compared. Under these circumstances, different persons make widely different estimates of the size of the field. I once tried the experiment of obtaining their estimate of the apparent size from ten individuals, all of them accustomed to the use of the instrument, and they varied from 9½-inch diameter down to 2-inch (my own case). I have since met an individual who estimated it 15 inches. Any one possessed of a microscope can try this experiment, and it will be found to afford a company much amusement, and excite great surprise.

"Now, it is self-evident, that to the one who made the estimate of 15-in., any object of, say 1-1000 of an inch in length, would *seem* to be seen 7½ times as large as it seemed to me, although we must have seen it exactly alike. Thus, the only conception of magnitude is comparative."

Cook's Telegraph.

We have before us as we write some very beautiful specimens of printing by Cook's improvement of the late Gaetano Bonelli's automatic printing apparatus, just received from Paris. The printing is done in fine bold letters, the words well compacted and spaced, and printed not on a continuous strip, but line under line, as in a printed circular. It is certainly a very admirable result, and indicative of a perfection in telegraphy and a use of the subtile powers of electricity which must enhance the acceptability of the telegraph to the public. The great advantage of the autographic process is that it renders error next to impossible, or rather, that it does not leave to the action of outside causes, or the use of arbitrary characters whose relations to each other may be misunderstood, or to the vagaries of an operator's brain as he manipulates his messages, letter by letter, the opportunity to change their composition. The message is set up and compared before it is transmitted, and if it goes at all, must go exactly as first prepared

The paragraph before us is one of 35 words, transmitted in 20 seconds, a speed equal to 315 messages of twenty words each per hour. This fact is suggestive of a future in which the entire labor of our offices will be changed, and the operation of transmission become simply mechanical and comparatively unlaborious. We will not be surprised if, in time, parties who prosecute much of their business by telegraph should supply themselves with telegraphic type, arrange their messages for transmission in a case adopted for that purpose, prove them before sending to the telegraph office, and the operator have nothing to do but pass them through the manipulating instrument. By such processes as these only can large quantities of matter be sent over the wires without the fatigue connected therewith, and, what is equally desirable, with the utmost assurance of correctness which mechanism can afford.—*Journal of the Telegraph.*

Editorial Summary.

The Velocipede Mania is beginning to set in, and with the opening of the spring months we may expect to see our parks and highways thronged with this cheap and agreeable substitute for the horse. The two-wheeled velocipede is not exactly the thing wanted for general use, as it will be somewhat difficult for novices to keep upright upon it. A nicely adjusted vehicle with a double hind wheel would be most desirable for all classes. The ladies will need something of the kind, and for obvious reasons; unless they don the Bloomer costume, they will not be able to ride on the two-wheeled machine. It appears to us, judging from the numerous letters we receive on the subject, that there is to be a brisk demand for a good velocipede, and whoever gets into the field first will find it a profitable speculation.

Geological Negatives.—Mr. James Thompson, of Glasgow, Scotland, has contrived a new method of producing photographic negatives of geological specimens. He saws from the stones thin slices containing fossil remains or other specimens; these when polished are so thin and transparent that they may be used as negatives for photographic printing upon the usual sensitive paper. Beautiful prints are thus obtained, having all the fidelity of nature itself. Large numbers of these fossil negatives have been prepared by Mr. Thompson, and he has undertaken to supply the British Museum with duplicates.

It is proposed to remove Yale College from its present site to a more suburban one, thereby securing to the institution an accession of funds from the sale of its property, which, from its central location, is of great value. The value of this property is sufficient, it is said, to to purchase and fit up suitable grounds, erect buildings, and leave an endowment of a quarter of a million dollars, should the proposal be acted upon. The removal of the college is also said to be worthy of consideration for sanitary reasons.

The Powell Scientific Expedition ascended to Longs Peak, in the Rocky Mountain range, on the 23d inst. After making the usual scientific observations a monument was erected as evidence of the visit. In it was placed a tin case containing a record of the observations with date, names of party, etc. A flag was planted and left flying. This peak is a celebrated landmark. Its hight however is not remarkable, being only 14,250 feet above the sea level.

The English scientific papers are criticising severely our new war steamers. They say that the entire new steam machinery of the United States navy is the most costly, most cumbrous, least efficient, and most utterly ridiculous in the world, and that no other power in Christendom would tolerate such blunders in its national engineering practice.

Comets Self-Luminous.—The London *Daily News*, says that the special points of interest attaching to the two comets of this year—Borsen's and the new one—is the remarkable discovery that both comets are gaseous and self-luminous, and that the latter consists of volatilized carbon.

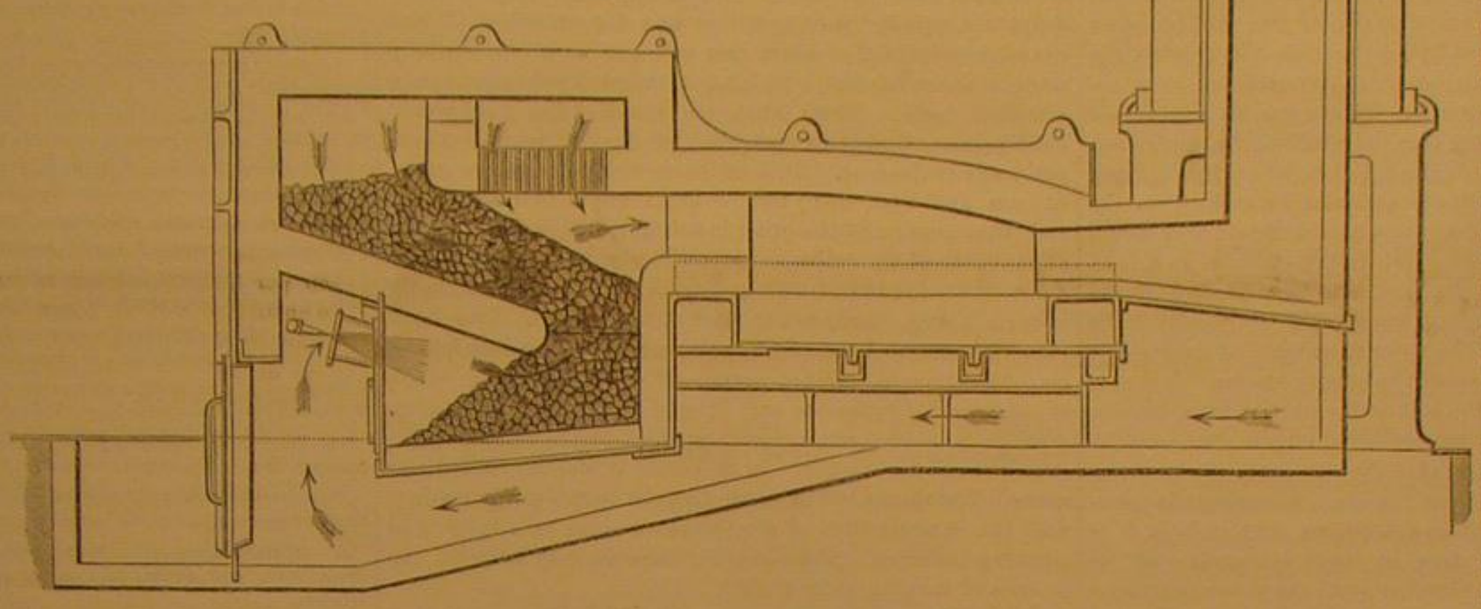
Cider may be preserved sweet for years, by putting it up in air-tight cans after the manner of preserving fruit. The cider should be first settled and racked off from the dregs, but fermentation should not be allowed to commence before canning.

It is stated as a fact worthy of note, that London was recently exempt from accidental or incendiary fires, for a period of twelve hours.

Improvement in the Process of Puddling Iron.

From the London *Mining Journal* we transfer the engraved plan and notice of a new puddling furnace now making considerable stir in England :-

" Mr. John Jones, the able secretary of the Iron Trade Association in the North or England, read a paper at the meeting of the British Association for the Advancement of Science, at Norwich, on the Economical Manufacture of Iron. He there states that, according to information he has gathered, the furnace is being adopted in the Cleveland district, and that the saving of fuel is 20 to 25 per cent., that the consumption is 1,500,000 tuns of coals per annum in the production of our finished iron, and that the subject is one of national importance.—This paper was followed by one by Mr. Siemens, F.R.S., the well-known eminent inventor of the gas-furnace, in which he gives some very interesting details of the working of a puddling-furnace on his system, justly claiming extraordinary merit therefor, on account of it producing a larger quantity of iron than the ordinary system of furnace permits. Mr.Cowper stated that, in his opinion, one great cause of the superior yield, as also quality of the iron, was that the great heat of Mr.Siemens' furnace caused it to run more freely from the cinder than was possible in an ordinary furnace.



WILSON'S PUDDLING FURNACE.

" With these preliminary remarks, we will now go into more detail. Messrs. W. Whitwell & Co., the Thornaby Iron Works, Stockton-on-Tees, so well known for their energy, enterprise, and determination to hold a first rank in the Cleveland iron trade, put up their first furnace in January this year ; it was very successful, but it had grate bars at the bottom, partly to meet the prejudices of the men, and to overcome them. In the month of March Mr. Wilson persuaded them to allow him to put up a furnace without bars, which he did. Forthwith the success was positive, all difficulties had completely vanished. For a little time minor points of construction had to be met ; but for some time every furnace was put up exactly like its neighbor, and at this moment nearly all the furnaces at the above works are on Mr. Wilson's system. Several of the woks in the district have trial furnaces at work, the results fully bearing out those of Messrs. Whitwell.

" At a trial made by Messrs. Hopkins, Gilkes & Co. (week 6th to 11th July inclusive), the coals used were 17 cwts. 1 qr. 22 lbs. to the tun of puddled bar ; the yield of iron in excess. Another experiment (week ending Aug. 22), the coals used were 16¾ cwts. to the tun ; 1¼ tun of fettling saved—iron charged, 13 tuns 16 cwts. 3 qrs. 13 lbs. ; iron drawn, 12 tuns 18 cwts. 0 qr. 16 lbs. ; loss, 18 cwts. 2 qrs. 27 lbs. Messrs. Richardson, Johnson & Co., of the North Yorkshire Iron Works, Stockton, furnish a return (Aug. 31), coals, 18 cwts. to the tun of iron ; yield, 13 lbs. average per heat in excess of ordinary furnace. Messrs. Whitwell and Co. are charging all their patent furnaces 4¼ cwts. per heat, and they find very little loss of iron; the quality is in all cases superior. We think that these statements justify us in saying that the ironmasters have an opportunity of saving a large amount of money in the manufacture of iron, and we trust such an invention will not be allowed to languish and struggle into notoriety by slow degrees, as most of our inventions have to, no matter how great their benefit to the public.

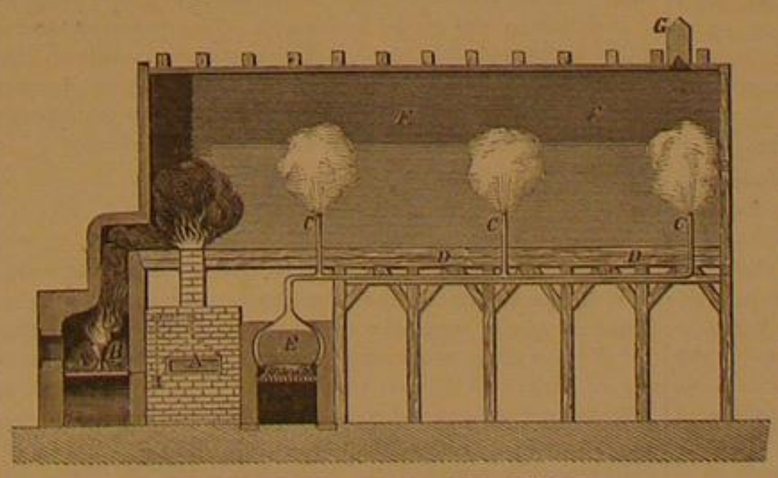
" We will now point out the improvements in the furnace. Air is forced into the flue-bridge by a steam-jet ; it passes into a conduit at the back of the furnace, thence into the flame-bridge and up into a chamber, where it arrives red-hot ; it thence passes down into and on to the incandescent fuel.

" By this arrangement much fettling is saved, being the cause of a great economy. Mr. Siemens states that his furnace used an extra quantity of fettling, which reduced the benefit of his good yield of iron. But to obviate this, he adopted water-bridges (these are much used); they absorb much heat from the furnace—this gentleman states equal to 8 or 10 lbs. of coals per heat. We think this a low estimate, as the getting up has to be taken into account. However, it is obvious that, by the arrangement described above, the heat abstracted by the circulating current of air is restored to the furnace ; this forms an important feature in the improvement. The fuel is fed at the highest point of the furnace by a slide door on the standing, and there are proper arrangements for shoring up, when required, also on the standing. A current or currents of air are also forced in below into a closed chamber, by which the cinders are most completely burnt up. The steam being decomposed passing through the incandescent fuel, transfers the intense heat into the working chamber. The quantity of refuse produced is very small. The clinkers are readily removed with a light hook, and the men are never occupied more than a few minutes in the operation, generally one minute. Thus, we are justified in saying this is perfect combustion ; it appears to us there is no room for further improvement. But to restore the waste heat into the generator, furnaces are now being put up by Messrs. Hannah & Sons, under the superintendence of their manager, Mr. Badon, formerly of Jarrow, where pretty nearly all the heat will be regenerated. These furnaces can go to any intensity, and the flame is under perfect control to oxidize or not ; or the iron may be drenched with intensely hot air. The cost of alteration to existing furnaces is very small ; when erecting new ones about the same price. The advantages obtained are no smoke, no cinders, a large yield of iron, and better in quality. If we assume 25 cwts. of coals used as the Cleveland average for puddling, it appears to be about 8 cwts. to the tun saved. Much fettling is saved, there are less repairs, and no grate bars to replace. We think there is sufficient inducement to ask its adoption." The editor of the *Journal* adds :

" In the supplement to this week's *Mining Journal* will be found an interesting communication from a correspondent who has had considerable experience in iron making, describing the recent improvements introduced by Mr. E. B. Wilson in the construction of his patent furnaces, and which are considered to make the furnace absolutely perfect. We are glad to learn that the increased yield of the Wilson furnace, as compared with that of ordinary construction, averages 13 lbs. per heat, the loss of iron being at the same time much reduced, and the quality being in all cases superior. The new furnaces are now in use at Messrs. Whitwell & Co.'s Thornaby Iron Works, Stockton-on-Tees ; at Messrs. Richardson, Johnson & Co.'s North Yorkshire Iron Works, Stockton ; at Messrs. Hopkins, Gilkes & Co.'s ; and at several other works, and appear in all cases to give great satisfaction. Having had the opportunity of seeing the Wilson furnaces in actual use, our correspondent is, no doubt, in a position to form an opinion of its merits. He states that the perfected furnaces make neither smoke nor cinders, give a large yield of iron, and of better quality ; that 8 cwts. of coal is saved per tun of iron puddled ; that the first cost of the furnace is no greater than usual ; and that there are less repairs, and no grate bars to replace. These recommendations should, it is thought, secure its adoption."

SULPHUR---ITS USES IN THE ARTS.

Every one of our readers is acquainted with the appearance of sulphur. Possibly many of them were made acquainted with its medical properties early in life, like Squeer's schoolboys, to whom it was regularly administered, as a measure of economy, in molasses, always before breakfast. It is quite possible that many are not so familiar with its chemical properties and its extended use in the arts. It is kept for sale everywhere in two forms ; roll sulphur, popularly known as brimstone, formed by concretion after fusion, and in a powdered state, obtained by pulverizing the roll sulphur, by sublimation, or precipitation from its solution in limewater by muriatic acid. Sublimation is the heating of any solid substance until it becomes vaporized, and collecting it again when cooled by passing the vapor into a refrigerating chamber. Sulphur thus sublimed can be obtained in a very fine and impalpable state, called flowers of sulphur. When obtained from the solution as described above, it is called lac-sulphur, or milk of sulphur.



SULPHURIC ACID CHAMBER.

Sulphur is an element, that is, it has never been found to be resolvable into other substances. Its affinities or tendencies to unite with other substances are numerous and strong, and under favorable circumstances it will combine with a vast number of simple and complex bodies. Its combinations with simple substances or elements are called sulphurets or sulphides. Such compounds form a large proportion of the ores of different metals, as they are found in nature. A simple experiment will illustrate the formation of these ores. Mix 21 parts by weight of flowers of sulphur with 30 parts of iron, and put it gradually into a red-hot crucible, waiting until each portion becomes incandescent before adding more. After the whole is put in, cover the crucible and raise the heat until the entire mass is fused. The compound is called the proto-sulphide of iron. There are also other sulphides of iron, which contain more sulphur in proportion to the weight of the mass than the proto-sulphide. Of these the bisulphide may be mentioned. It has a pale yellow metallic luster, and has often been mistaken for gold by the inexpert. In the early settlement of this country an enterprising adventurer shipped a whole cargo of this substance to England, supposing it to be gold, and that he had, to use a quite modern phrase, "struck oil." His chagrin was great upon finding the value of his venture less than an equal bulk of good garden soil. So many similar mistakes have been made that the substance has been called "fools' gold." The mineralogical name for it is iron pyrites. These sulphides are types of the sulphides of other metals, as found native or artificially produced. The proto-sulphide of iron is used in the laboratory for making hydro sulphuric acid gas, to which the names sulphydric acid and sulphureted hydrogen are also given. Hydrosulphuric acid is a most valuable reagent in analytical chemistry, and therefore deserves some mention here. When fragments of proto-sulphide of iron are thrown into dilute sulphuric acid, a series of reactions take place, which may be described as follows:

Sulphuric acid is a combination of sulphur and oxygen ; the proto-sulphide of iron is a combination of sulphur and iron ; the water used to dilute the acid is a combination of oxygen and hydrogen. When these couples come together, iron, which loves not sulphur less but oxygen more, deserts its own partner and unites with the faithless oxygen of the water, which leaves fond hydrogen desolate. Sulphur and hydrogen, under these circumstances, mutually sympathizing with each others wrongs, strike up a bargain, and agree to unite their fortunes. The sulphuric acid aids and abets the disruption by providing for the protoxide of iron as fast as it is formed by the union of iron and oxygen, and uniting with it, forms the sulphate of iron. The sulphureted hydrogen formed by the union of the sulphur and hydrogen not being so fortunate, goes off in exceedingly bad odor. The smell of this gas is discernable in the decay of all organic substances which contain sulphur, as turnips, cabbages, eggs, etc. The smell of rotten eggs is its most prominent characteristic, and is the principal test for its presence. The most minute quantities, imperceptible to smell, may be detected by moistening a bit of paper with a solution of acetate of lead. Paper so prepared is turned black by the action of the gas. The reason for this change of color will give the clue to the value of this reagent in chemical analysis. Metallic salts are formed by the union of their oxides with acids. When sulphydric acid comes in contact with solutions of these salts, a mutual decomposition takes place, the hydrogen of the sulphydric acid unites with the oxygen in the metallic base, and forms water, while the sulphur combines with the metal itself, to form a sulphide which generally falls to the bottom as a bulky precipitate. The conditions under which these reactions take place vary for different metals. Thus, the metals capable of being precipitated may be classed into groups. The alkalies are not precipitated by it under any circumstances, neither are the alkaline earths. A third group, comprising the salts of alumina and the sesquioxide of chromium, and a number of others of very rare occurrence, are not precipitated by sulphydric acid but by sulphide of ammonium. The metals of the third group and the remaining metals are precipitated under certain conditions, either by sulphide of ammonium or by sulphureted hydrogen, the precipitate being in the third group a hydrated oxide, that is, an oxide combined with water, and in all other cases a sulphide, or the mixed sulphides of all the metals precipitable by these reagents. Suppose now a chemist wishes to determine whether sodium is a constituent of a very complex solution under examination. By passing a sufficient quantity of sulphureted hydrogen through the solution under the proper conditions, he can eliminate all the metals, except the groups above specified not precipitable by this reagent. The field of research is thus greatly narrowed, and a very long step is taken toward the complete isolation of the substance sought. This brief description will give a correct idea of the great value of this reagent in chemical analysis.

Sulphur forms acids by combination with oxygen, the most important of which is sulphuric acid, more popularly known as oil of vitriol. This substance may be called the Goliath of chemistry. No other substance known has such extended and diversified applications. There is scarcely a department of the arts that does not directly or indirectly involve its use.

From iron founding to the manufacture of gingerbread; in agriculture, in dyeing, in painting; indeed it would be very difficult to suggest a trade, occupation, or profession that does not depend more or less upon this most important substance. A friend asks over our shoulder, "Do you include lawyers and clergymen?" Most certainly we do. The paper upon which, and the ink with which lawyers and clergymen write, involve in their manufacture the use of sulphuric acid. Try something else. Hesitatingly—"boot-blacks." Out again. No blacking without the immediate or remote use of sulphuric acid. Once more. "No, I give it up if the two extremes are not exempt. I'll none of the means."

The processes of manufacturing sulphuric acid are various. The fuming *Nordhausen* acid is distilled from the sulphate of iron, popularly known as green vitriol. The acid as thus obtained is in a state of the highest concentration it can attain in a fluid form. A proper redistillation of this acid produces a white fibrous mass of a silky appearance—solid sulphuric acid. This is called anhydrous sulphuric acid, the term *anhydrous* meaning without water. This is a most remarkable substance. Notwithstanding it is the most concentrated form in which the acid can be obtained, it has no acid properties. It is tough, waxy in consistence, and may be molded in the hands without danger. The concentrated liquid acid would soon reduce them to a state resembling pounded raw beefsteak. Anhydrous sulphuric acid, or concentrated liquid sulphuric acid is a very thirsty substance. Its fondness for water is only equaled by the disgust which that fluid seems to excite in some individuals of the human species. If it cannot get water elsewhere the acid will absorb it from the air. The anhydrous acid thus becomes liquid after a time, and the liquid gradually becomes weaker by exposure. It is therefore necessary to keep it from the air. Advantage is taken of this property to dry certain substances from which it is difficult to extract water. An open vessel containing acid is placed under a bell-glass, together with the substance to be dried. Being thus imprisoned together, the acid appropriates to itself all the moisture which the bell-glass incloses, and so without artificial heat a substance may be perfectly dried. Its attraction for water is so great that when poured into the latter it hisses like a red hot iron Strong acid exposed to the air will absorb water enough to double its weight. Mix four pints of this acid with one pint of water, and there will be considerably less than five pints of the mixture. This shows that the attraction of sulphuric acid for water is very strong indeed, sufficient to compress it more than a pressure of hundreds of tuns to each square inch of surface would do if applied to that fluid separately. Were we not right in calling it a Goliath?

We have already said that very large quantities of this substance are used. In England alone over one hundred thousand tuns are used annually, and its manufacture is conducted on a large scale in quite a different manner from the method above described for making the Nordhausen acid. That method is only practiced at Nordhausen, in Saxony, from which the acid takes its name. In order to understand the manufacture of sulphuric acid as it is conducted on a large scale, we must first know something of nitric acid. Nitric acid is composed of nitrogen and oxygen. These two gases mixed constitute the bulk of the atmosphere which we breathe, but when chemically combined in the proper proportions they form the nitric acid of chemistry—the aquafortis of the shops—an acid ranking next in strength and importance to sulphuric acid. The salt known as nitrate of soda is composed of nitric acid and soda. When sulphuric acid is poured upon nitrate of soda, the salt is decomposed, the sulphuric acid unites with the soda to form sulphate of soda, and the nitric acid becomes free. It is liberated in the form of a gas, and in this state it is used in making sulphuric acid. Remember its components—oxygen and nitrogen. When sulphur is burned in air the oxygen of the air combines with it, and forms sulphurous acid. This is also a gas, but like most other acid gases it is freely absorbed by water. One half more oxygen than it already contains would, if combined with it, change it to sulphuric acid. The process of making sulphuric acid can now be understood. First, sulphur is burned to form sulphurous acid; second, nitric acid is made to give a portion of its oxygen to transform the sulphurous acid into sulphuric acid; then the compound of nitrogen and oxygen which remains (deutoxide of nitrogen) seizes oxygen from the air (though not as much as was absorbed at first by the sulphurous fumes), becoming peroxide of nitrogen, only to be again robbed of its oxygen by the sulphurous acid, and so on *ad libitum*, the sulphuric acid, as fast as it is formed, combines with steam which is generated for that purpose, and is further absorbed by water. The engraving illustrates the apparatus by which this process is effected. A A are furnaces in which the sulphur is burned; in the current of heated gas is suspended an iron pot, B, containing nitrate of soda and oil of vitriol. The nitric acid vapors are thus intimately mingled with the sulphurous fumes, and pass through flues into the chamber, F F. This chamber is of lead, and is supported on strong timber framework. Water two or three inches in depth is placed upon the floor of the chamber, D D, to absorb the acid. Jets of steam are admitted from the boiler, E, through the pipes, C C C. An exit flue, G, permits the escape of nitrogen and nitric oxide, the only gases which can escape in a properly managed chamber. Some modifications of this process have been invented by Gay Lussac and others, by which saving is made in the amount of the salt used, but the general principle remains unchanged. The leaden chambers are frequently of enormous size, some of them being three hundred feet in length by twenty in width and twelve to fifteen feet in hight. The acid as drawn off from the chambers is too dilute for use in the arts. It is therefore concentrated in lead, glass, or platinum vessels, lead being used only for acids whose specific gravity is not required to be more than 1·720. This is the brown acid of commerce, and it usually contains many impurities. The concentrated acid of commerce is much stronger, having a specific gravity of 1·842, according to Bineau.

We have already noticed two acids, namely, sulphuric and sulphurous, formed by the union of sulphur and oxygen, as well as one formed by the union of sulphur and hydrogen—sulphureted hydrogen. There is still another oxacid, containing a small proportion of oxygen, called hyposulphurous acid. All of the oxacids combine with numerous bases to form salts extensively used in the arts. It would extend this article too much to specify these applications and describe them; they would fill volumes. But there is one class of these salts we must say something about, namely, the alums. There are several kinds of alums, of which the common alum of the shops is a type in its composition and its qualities. If you examine a crystal of alum you will see a white, partially transparent substance, which has a sweetish astringent characteristic taste. From such an examination you would hardly guess that it is composed of five different elements, yet such is the case. Two of these components are gases, oxygen and hydrogen; two of them are metals, aluminum and potassium; and the other is sulphur, which forms nearly one seventh of its entire weight. Throw your crystal upon a hot stove, and it will melt and froth and bubble, and finally become a dry, hard, white, and opaque mass. You have partly decomposed the salt by the process; it has lost $\frac{216}{474}$ of its former weight. What passed off was only water, which is composed of hydrogen and oxygen; what remains is composed of four elements, and sulphur now composes nearly one fourth the entire weight. In this state it is called anhydrous alum. The alums are in large demand in the art of dyeing, and the manufacture of the common alum is a large and growing industry. At some other time we may describe the process of making alum in full.

Take a lump of charcoal and a roll of brimstone and place them side by side. Nothing, to one unacquainted with the wonders of chemistry, would seem more improbable than that these hard and opaque substances could unite to form one of the clearest, most limpid and colorless fluids known. That is so, however, Charcoal is nearly pure carbon. Sulphur and carbon unite to form the bi-sulphide of carbon, a fluid so clear and of so high a refracting power that it has been used, inclosed in a triangular glass box, for the prism of that most wonderful instrument, the spectroscope, of which you have heard and read much, and will probably hear a great deal more ere another decade passes.

Take a piece of the ordinary rubber sold at the present time in the shops; put it on a fire shovel and hold it over the coals; in a short time it will soften and fry, and presently it will commence burning with a blue flame. It is sulphur which burns with the blue flame, a very large proportion of the substance called india-rubber being sulphur. By a peculiar process this rubber can be rendered hard as horn, and in this state it is now used for combs, brush and knife handles, and even for the plates upon which dentists fix artificial teeth.

Sulphur is also largely used for bleaching, its fumes while burning producing that effect. Straw goods are thus whitened.

We might fill this paper with the enumeration of the uses of sulphur and its compounds. Any chemist will tell you that we have only skimmed over the surface of the subject. We have omitted to mention many of the properties of sulphur, some of which have given rise to much speculation. Sulphur is found plentifully distributed in the crust of the earth, but is most abundant in volcanic regions, one of the principal sources being the Island of Sicily, where it is found in an uncombined state. There is perhaps no other substance, unless it be iron, upon which the arts and refinements of civilization are more dependent. The world could infinitely better afford to lose all of the precious metals and precious stones, rather than be deprived of its sulphur deposits. The thought may serve to render the substance more palatable, when your physician prescribes it in the future.

Who Ate Roger Williams?

Steele's "Fourteen Weeks in Chemistry," says:

"The truth that animal matter passes from the animal back to the vegetable, and from the vegetable to the animal kingdom again, received a curious illustration not long since.

"For the purpose of erecting a suitable monument in memory of Roger Williams, the founder of Rhode Island, his private burying ground was searched for the graves of himself and wife. It was found that everything had passed into oblivion. The shape of the coffins could only be traced by a black line of carbonaceous matter. The rusting hinges and nails, and a round wooden knot, alone remained in one grave; while a single lock of braided hair was found in the other. Near the grave stood an apple tree. This had sent down two main roots into the very presence of the confined dead. The larger root, pushing its way to the precise spot occupied by the skull of Roger Williams, had made a turn as if passing around it, and followed the direction of the backbone to the hips. Here it divided into two branches, sending one along each leg to the heels, when both turned upward to the toes One of these roots formed a slight crook at the knee, which made the whole bear a striking resemblance to the human form. There were the graves, but their occupants had disappeared; the bones even had vanished. There stood the thief—the guilty apple tree—caught in the very act of robbery. The spoliation was complete. The organic matter, the flesh, the bones of Roger Williams had passed into an apple tree. The elements had been absorbed by the roots, transmuted into woody fiber, which could now be burned as fuel, or carved into ornaments, and bloomed into fragrant blossoms, which delighted the eye of the passer-by, and scattered the sweetest perfume of spring; more than that—has been converted into luscious fruit, which, from year to year, had been gathered and eaten. How pertinent, then, is the question, 'Who ate Roger Williams?'"

MANUFACTURING, MINING, AND RAILROAD ITEMS.

The Agawam Nail Works, Mass., resumed operations on the 12th inst.

The expense for labor upon the Holyoke dam, in Massachusetts, is $800 per day.

The consumption of flour in the city of Boston is said to be one million barrels per annum.

Europe is said to own $983,400,000 of American Railroad, State, and Government bonds.

A firm at East Boston use six tuns of iron per day in the manufacture of telegraph wire.

It is stated that preparations are on foot to re-open the Schenectady and Athens route of the N. Y. Central Railroad.

Middletown, Conn., has voted $67,000 more stock in the Air Line Railroad. This brings its entire subscription up to $260,000.

There are sixty thousand people engaged in watchmaking in Switzerland They turn out over a million of watches each year.

The refinery of Messrs. Rockefeller, Andrews & Flagler, at Cleveland, Ohio, produces 1,100 barrels of refined petroleum per day.

It is estimated that by 1870 there will be 50 000 miles of railway completed in the United States, enough to twice girdle the earth.

The iron bridge over the Housatonic river at Great Barrington, Mass., is completed. It is an elegant and expensive structure.

There are at present 557 woolen mills in Ohio, Michigan, Illinois, Indiana Wisconsin, Iowa, and Minnesota, with a capital of $5,500 000.

The Directors of the Chicago and Northwestern Railroad have fully determined to resume construction upon the Winona and St. Peter line.

The Chicago, Burlington, and Quincy Railroad Company is building a new freight depot at Quincy, to accommodate its increasing business.

A single manufactory in Maine has this season packed 1,600,000 cans of green corn, and during the spring and fall has canned nearly 600,000 lobsters.

The Bay City Iron Company have begun to build works at Bay City, Mich., in which they will carry on the foundery and machine business on an extensive scale.

The town of Farmington having refused to loan its credit to the Connecticut Western Railroad the Company have changed their route and left Farmington out in the cold.

The highest mine in the world is the Potosi silver mine, 11,375 feet above the level of the sea. The deepest is a salt mine in Westphalia, 2,050 feet below the surface of the ocean.

A beet root sugar manufactory is about to be established in Buena Vista County, Iowa. The machinery is to come from France at a cost of $100,000. Five thousand acres have been purchased upon which to grow the beets.

A. M. Wheeler, of Halifax, has cut a hemlock tree from which was made twelve thousand shingles, all clear, first rate shingles, leaving timber enough for five or six hundred feet of boards, and lots of good wood for fire, beside three-fourths of a cord of bark.

A watchman at the car shop in St. Albans, went to a drawer in search of a pipe the other night. Not finding it he lighted a match and fire from it dropped into the drawer which contained about a quarter of a pound of gunpowder. The consequence was an explosion, and the man's face, hands, and arms were badly burned.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

Varnish.—Isaac Ranney, Delaware, Ohio.—This invention has for its object the production of a very lustrous, durable, and economical varnish for general use.

Carriage Step.—George Panchot, Hastings, Minn.—The object of this invention is to provide a neat, simple, and cheap attachable and removable step for wagons and other carriages.

Buggy-top Fastening.—D. S. Early, Hummelstown, Pa.—The object of this invention is to provide a simple and cheap device for securely fastening the top of a buggy to the seat, which, by simply throwing down or up a hinge joint in the fastening rod, will instantaneously lock the top to the seat or loose it therefrom.

Car Coupling.—J. P. Freeman, Dalton, Whitfield, Ga.—This invention has for its object the construction of a simple and efficient coupling for railroad cars, which shall combine with the old-fashioned method of coupling by hand, an automatic coupling of new and greatly improved construction and operation.

Harvester.—Isaac H. Palmer, Lodi, Wis.—In this invention, the platform, upon which the grain is delivered by the reel, is placed directly behind the cutter, and is tilted at every revolution of the reel or of one of the draft wheels, so as to deliver the sheaf upon the ground and set the platform again to receive another sheaf.

Fence.—Obadiah Love, Saxenburgh, Pa.—The object of this invention is to obtain a neat, light, cheap, and portable wooden fence, which is capable of being easily converted into a temporary shelter for sheep and other animals. Simply doubling the panels and interlocking their ends is all that is required to hold them together.

Manufacture of Shot.—Wm. Glasgow, Jr., and John G. Wood, St. Louis, Mo.—The object of this invention is to do away with the high lofty towers, now used in the manufacture of shot, which is accomplished by dropping the lead through a denser medium than air, such as mercury, glycerin, sirup, oils, etc., the temperature and density of which will be regulated according to the size of shot to be made.

Machine for Dressing Millstones.—Wm. Bold, Sheboygan Falls, Wis.—The object of this invention is to accomplish the cutting or dressing of the 'lands," so called, of millstones, in an easy and expeditious manner.

Corn Harvester.—John D. Hampshire, Paper Mills Post Office, Md.—This invention relates to a new and improved machine for harvesting maize or Indian corn.

Railroad Switch.—Hiram Beckwith, Grass Lake, Mich.—This invention relates to an improvement in the method of operating railroad switches, and it consists in the method of securing the switch lever and holding it in place.

King-bolt and Whiffletree Plate for Wheeled Vehicles.—Levi Adams, Amherst, Mass.—This invention relates to a new and improved king-bolt and whiffletree plate for wheel vehicles, whereby several advantages are obtained.

Pump Valve.—J. A. Nichols, Paterson, N. J.—This invention relates to an improvement in the method of constructing pump valves, being more particularly designed for steam fire engines, but which may be applied to other pumping engines.

Lubricating Device for Steam Cylinders.—George Girty, Rainier, Oregon.—This invention relates to a new and improved device for lubricating steam cylinders, and it consists of a novel arrangement of valves, oil chamber, and lever.

American Railway Master Mechanics Association.

A convention of Railway Master Mechanics was held at Cleveland, Ohio, Sept 30, at which time an organization was formed, and the above title adopted. The following officers were chosen: President, Mr. H. M. Britton, of the Indianapolis, Cincinnati and La Fayette Railway; Vice-president, Mr. N. E. Chapman, of the Cleveland and Pittsburg Railway; Secretary, Mr. Frederick Grinnell, of the Atlantic and Great Western; Treasurer, Mr. S. S. Hayes, of the Illinois Central Railway. A constitution was adopted and signed by the gentlemen present, a large number of railroads being represented. A Committee on Order of Business was appointed, which reported the following subjects for discussion:

1. Are steel plates preferable to iron in the construction of locomotive boilers, and if so will the difference in strength, durability, and safety, justify the excess of cost of steel as compared with the cost of the best iron?

2d, What should be the thickness of steel or iron plates when used in the construction of the outside shell of a forty-eight inch boiler? Also the best and strongest mode of riveting and bracing the same?

3d, What water space is deemed best upon the sides and ends of a furnace, both for wood and coal burning engines?

4th, How does the durability of steel for furnaces and flue sheets compare with that of copper or best iron?

5th, What space should there be between the flues so as to obtain the greatest absorption of heat?

6th, What size flues and what length will give the best results in wood and coal burning engines?

7th, What is the experience of the different master mechanics as to the wear and tear of steel tires now in use on their respective roads?

8th, What are the views of this convention on the subject of packing for cylinder and stuffing boxes?

9th, What are best modes of preventing the formation of lime and other incrustations in boilers?

10th, What is the opinion of this convention as to the present system of safety valves, levers and fixtures upon locomotive and other boilers—is it the safest and best?

11th, Would not the adoption of a "lock up valve," that could not be interfered with by the engineer, tend to the prevention of explosions now so frequent?

The following committees were appointed to report upon these subjects at the next meeting:

On the articles 1st to 6th, inclusive, Messrs. Hayes, Jauriet, and Anderson; article 7th, Philbrick, Eddy, and Perry; article 8th, Brown, Chapman, and Smith; article 9th, Dripps, Towne, and Ray; article 10th and 11th, Stone, Young, and Wells.

On motion a committee of three—Messrs. Kinsey, Cooper, and Congdon—was appointed on valves anti-friction, size, etc. Messrs. Losey, Cullen, and Little, were appointed a committee on the explosion of boilers.

After the transaction of some minor business, the meeting adjourned, to meet at the shops of the Pennsylvania Central Railway at Pittsburgh, Pa., on the second Wednesday of September, 1869.

Adulterations in Vinegar.

The *Prairie Farmer*, has the following on adulterations in vinegar: Since the great increase in the price of high wines, on account of the heavy tax imposed by the Government, there has been a disposition, on the part of vinegar manufacturers, to produce the requisite degree of acidity by means of a cheaper substance than acetic acid, which forms the acidity of all pure vinegar, and which can only be produced by the oxidation of alcohol. Sulphuric, nitric, and hydrochloric acids are all employed for this purpose, but in the great majority of cases, the former is used, on account of its extreme cheapness and its intense sourness.

This acid may be detected, even in extremely small quantities, by taking a portion of the suspected vinegar, placing it in a clear glass vessel, and dropping into it a few drops of a solution of the chloride of barium, or the nitrate of barita If the vinegar remains clear after the introduction of this substance, it is sufficient proof that it contains no sulphuric acid. If, on the other hand, the liquid presents a cloudy appearance, it is on account of the formation of the sulphate of barita, which will remain insoluble, whatever acid may be afterwards added.

The detection of nitric acid is not so easy. It may be discovered, however, by first adding to the vinegar placed in a wine glass, a few drops of sulphuric acid, waiting a few minutes for the mixture to cool, and then dropping in a crystal of the sulphate of iron, or copperas. If nitric acid is present, a brown ring will form around this substance, in the bottom of the glass.

To detect hydrochloric or muriatic acid, we have only to bring the suspected vinegar to a moderate heat, and to hold over it a glass rod or shaving of wood, moistened in aqua ammonia. If this acid be present, it will form white fumes as the two substances come in contact, forming, as they do, chloride of ammonium, or sal-ammoniac.

Ordinarily, however, it will only be necessary to test for sulphuric acid; but this should always be done before using vinegar, as this acid is very injurious to the health, and exceedingly liable to destroy substances placed in it to be preserved, as pickles. A few cents' worth of the substance we have recommended under this head, is sufficient to test all the vinegar which would be used in a family for many years. The cheapness of sulphuric acid is so great that vinegar may be made from it—or, rather, a substance that passes by the name of vinegar—for only a cent or two per gallon. That it is so made, is evident from the fact that carboys of sulphuric acid are to be found in most of the manufactories of "pure cider vinegar," in this as in other cities.

THE first mill in America for making sewing silks and twists by water was built by Rodney Hanks, in Mansfield, about fifty-eight years since. The first silk made by machinery in the United States was made in 1829, in Mansfield In 1814 silk rose to $30 a pound. The census of 1810 gives us the value of the silk manufacture and raw silk of Massachusetts and Connecticut for that year.—$29,121. In Windham County, Connecticut, the value of these products in 1825 was $54,090. In 1831 Mansfield produced 84,000 worth of silk.

Can Any One Beat This?

OLD SAYBROOK, CONN., Sept. 26, 1868.

MESSRS. WHEELER & WILSON:

Gentlemen:—I wish to say that I have in my family a "Wheeler & Wilson Sewing Machine," that has been in almost *daily* use for the past ten (10) years, and not a thing has ever been done to it in way of repairing; not a screw loose, or any part of it out of order in all that time. It has been used in making coats, vests, and pants, of the thickest of woolen goods, beside doing all kinds of family sewing, and is now, this day, the best machine for work I ever saw.

Can any one beat this?

Respectfully, GILBERT PRATT.

Any one who can beat this (and we think many can), will please address Messrs. WHEELER & WILSON, 625 Broadway, New York.

OFFICIAL REPORT OF PATENTS AND CLAIMS

Issued by the United States Patent Office.

FOR THE WEEK ENDING OCTOBER 20, 1868.

Reported Officially for the Scientific American.

PATENTS ARE GRANTED FOR SEVENTEEN YEARS, the following being a schedule of fees:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Reissue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay $500 on application.

☞ *Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to Inventors, may be had gratis by addressing MUNN & CO., Publishers of the Scientific American, New York.*

83,124.—CAR-COUPLING.—George S. Acker, Kalamazoo, assignor to himself and H. A. Lacey, Detroit, Mich.

I claim the plates, J and K, thimble, L, hasp, M, and channel, N, in connection with the link, I, and pin, D, and draw bar, A, when arranged and operating substantially as and for the purposes set forth.

83,125.—BOILER SAFETY VALVE.—Edward Andrews, Pottsville Pa. Antedated October 9, 1868.

I claim, 1st, The arrangement and combination of the balanced valve, E, with the valve, J, lever, H, piston, K, and yoke D.

2d, The arrangement of the box, B, inclosing the valves, J and W and lever, H.

83,126.—INKSTAND.—H. P. Andrews, and M. E. Rawson, Cleveland, Ohio.

We claim, 1st, An ink-elevating elastic air sack, constructed with a perforated corking end, which is of thicker material than the body of the sack, substantially as described.

2d, The horizontally sliding cover, D, pressure plate, F, one or more air chambers, E, and one or more ink reservoirs, G, combined and operating substantially as described.

3d, The cover, D, pivoted at b, and extended into a lever beyond said pivoted point, and connected with a laterally rocking or rolling plate, F, substantially in the manner described

4th The ink reservoirs, G G, in combination with a case, A which is provided with a removable top and means for effecting the raising of ink into supply cups by the movement of a single cover to said cups, substantially as described.

83,127.—REVENUE STAMP FOR LIQUOR BARRELS.—George W. Bishop, Baltimore, Md. Antedated October 6, 1868.

I claim, 1st, The oblong plate, A, provided with flanges on the sides, and with a central box, B, when constructed substantially as and for the purposes specified.

2d, The "stamp," C, made of soft metal, and provided with pins, b b, as described, and used with the beveled box, B, substantially as set forth.

3d, The combination of the perforated slide, D, with the box, B, in the plate, A, and stamp, C, when used as and for the purposes specified.

4th, The forms, 1 1', placed in the plate, A, under the slide, D, as and for the purposes specified.

83,128.—GROOVING MACHINE.—William H. Bond, and George G. Lee, Syracuse, N. Y.

We claim an arm, B, when constructed in such manner as to alternately present a plain or grooved rolling face, as desired, substantially as and for the purpose herein described.

83,129.—PERMUTATION LOCK.—Edward W. Brettell, Elizabeth, N. J.

I claim the hollow wheel, B, pawl, t, with its arms, r and s, in combination with the inner circular tumblers, and the case, A, all constructed and arranged to operate in the manner and for the purpose set forth.

83,130.—PLOW POINT.—Lyman D. Burch, Sherburne, N. Y.

I claim, 1st, The ribs or braces, D, D1, and D2, constructed and operating substantially as described.

2d, The stays, E and E', constructed and operating substantially as described.

83,131.—SAW FRAME.—Beauman Butler, and Charles F. Ramsay, St. Johnsbury, Vt.

We claim, 1st, The saw frame, constructed substantially as above described with a rigid end, A A' C E, and a flexible end, B C E'.

2d, The provision, in a buck saw frame, of the spring or cushion, G G', substantially as and for the purpose set forth.

3d, The slotted ears, I I, or their equivalent, employed to connect the cross bar and end piece, and permit mutual play between them, substantially as described.

83,132.—HOSE, AND MACHINE FOR MAKING HOSE.—George Coles, London, and James Archibald Jacques, and John Americus Fanshawe, Tottenham, England. Patented in England August 17, 1864.

We claim, 1st, As a new article of manufacture, flexible hose, when constructed substantially as and for the purpose specified.

2d, The apparatus, constructed as described, whereby alternate layers or piles of yarn or thread are laid helically round the core in opposite directions, as herein set forth and shown.

83,133.—FEEDING MECHANISM FOR SEWING MACHINES.—J. L. Coles, and David H. Coles, New York city.

We claim, 1st, The cam slide, C, in combination with the feed bar, A, substantially as and for the purpose described.

2d, The feed bar, A, in combination with the cam slide, C, constructed as described, and its mechanism for adjustment, as and for the purpose set forth.

3d, The adjusting screw, G, in combination with the cam slide, C, and feed bar, A, substantially as and for the purpose described.

83,134.—SNAP HOOK.—Edward A. Cooper, Buffalo, N. Y.

I claim the hook, A, cast with hinge pin, e, and cross bar, h, in combination with the grooved tongue, D, and bow spring, b, when the parts are arranged and secured together in the manner described.

83,135.—VENTING CORE.—George G. Cressey, Philadelphia, Pa Antedated October 8, 1868.

I claim the box, E, its plate, G, and prints, H, in combination with the sliding plate, F, and its pointed wires, K, and the mechanism herein described, or its equivalent, for imparting the desired movement to the said plates.

83,136.—BOAT DETACHING APPARATUS.—Thomas L. Cuthbert, Charleston county, S. C., assignor to himself, Nathaniel Levin, and Edward J. Marks.

I claim the "marine cradle," by which ships' boats or yawls may be lowered and detached in the manner described in the above specification, or any other substantially the same, and which will produce the intended effect.

83,137.—LOCK FOR TRUNKS, PIANOS, ETC.—C. N. Cutter (assignor to Davis, Hill & Co.), Worcester, Mass.

I claim, 1st, The combination, with the face plate, D, of the hinged tongue C, substantially as and for the purposes set forth.

2d, The combination, with the face-plate, D, of the hinged tongue, C and spring, E, substantially as and for the purposes set forth.

83,138.—TRACK LIFTER.—Charles De Bergue, Westminster, Great Britain.

I claim the within described instrument, consisting of the metal bed plate, a, pivoted lever, b, and operating screw, c, the whole constructed and operating substantially as and for the purpose herein set forth.

83,139.—STOVE-PIPE DAMPER.—William H. Deily, Sycamore, Ill.

I claim the two part case, formed by the parts, A and M, having flanges, D B, for supporting the joints of pipe, and a recess inside, in which a damper, H, is made to operate for regulating the draft, substantially as and for the purpose set forth.

83,140.—NOZZLE FOR CANS.—Frederick W. Devoe, New York city.

I claim, 1st, The plate, C, made separate from the nozzle and can, in combination with the nozzle and the can, substantially as and for the purpose herein specified.

2d, The box formed within the nozzle by the closed bottom, C, and the cap or stopper, substantially as herein described.

83,141.—CLOTH DRAWERS.—Job Dyson, New Britain, Conn.

I claim cloth drawers made by forming each half or leg portion in one piece, with the seam down the back of the leg, and an opening, B, suitably located to form the body connection of the two legs, substantially as shown and described.

83,142.—RAILROAD-CAR HEATER.—John C. Eckert, Dayton, Ohio.

I claim, 1st, The knob or trigger, N, in combination with the vase, for the purpose set forth.

2d, The inner catch, T, with the shutter, P, its spring, S, and arm, Q, as herein described and shown.

3d, The falling door or shutter, C, and spring, E, acting in combination with the slot, D, the lever, F, and slide, G, arranged to operate substantially as herein described, and for the purposes set forth.

83,143.—PAPER CUTTING MACHINE.—Spencer Ellsworth, Lacon, Ill.

I claim, 1st, The combination of the bar or way, C, the sliding carriage, D, the vertically adjustable knife, K, and screw, S, all arranged, constructed, and operating in the manner and for the purposes herein set forth.

2d, The combination of the bar, C, provided with the grooves, c, the carriage, D, provided with the rib, b, and adjustable rib, d, and the screw, L, all arranged to operate in the manner and for the purposes described.

3d, The combination of the bar, C, carriage, D, knife, K, screw, S, movable rib guide, d, and screw, L, all arranged in the manner and for the purposes specified and shown.

4th, The combination of the bar, C, frame, A, rods, F, springs, G, treadle, N, and toothed plate, P, arranged to operate as specified, and for the purposes set forth.

83,144.—PERMUTATION LOCK.—William F. Ensign, Troy, N. Y.

I claim, in combination, the interlocking of the wheels or tumblers, and closing of the gateway in the wheels by the slides, as shown and described.

83,145.—WASHING MACHINE.—Robert E. Ferguson, Chicago, Ill.

I claim the arrangement of the wringer rib, I, centrally over the tub of the machine, when supported upon a bar or bars, C D, which at the same time encloses and protects the gearing of the machine from the water expressed from the clothes by the wringer, all constructed and operating as and for the purposes specified.

83,146.—COMBINED SKIRT AND HOSE SUPPORTER.—Maria J. Fess, Charlestown, Mass.

I claim the skirt-supporter, B, to which are attached the hose supporters, D, the latter being provided with hip pads, C, and the whole being combined and arranged substantially as set forth.

83,147.—MACHINE FOR CARBURETING AIR.—Theodore F. Frank, Buffalo, N. Y.

I claim, 1st, An upright cylindrical vessel forming the carbureting chamber, D, regulating compartment, G, and water tank, I, containing the air drum, H, arranged respectively one above the other, and with the supporting frame, A A' B, and operating weights, W W, substantially in the manner and forth.

2d, The combination and arrangement of the elevated pipe, b, with the regulating vessel, G G', substantially as and for the purpose specified.

83,148.—SPLINT KNIFE.—Samuel Friend and John McCollom, Decatur, Ill.

We claim the construction and arrangement of the stock, A, flat rectangular knife blade, B, secured thereto by means of the stirrups, a a, and adjusted by means of the set screws, b b, curved metal spring apron, C, secured to the beveled under side of said stock, A, its outer end projecting therefrom and guiding the splints, as herein set forth, for the purpose specified.

83,149.—PLASTIC COMPOSITION.—Hannah C. Gaskin, Union Vale, N. Y.

I claim, 1st, A plastic composition of flour or starch, treated substantially as described, in combination with glue, resin, gum, or other equivalent substance, as described.

2d, The new article of plastic manufacture, substantially as described.

83,150.—REIN HOLDER.—Lorenzo D. Gillett, Rochester, and Henry W. Inman, Detroit, Mich.

We claim the construction of a rein holder, with bed plate A, curved lever, F, and spring, D, arranged and operating substantially as herein described.

83,151.—SEED PLANTER.—John M. Gitchell, Haverhill, assignor to J. F. Morse, North Haverhill, N. H

I claim for effecting the reciprocating movements of the slider F, by means of the wheel or roller, H, the combination of the vibratory frame, G, the pulleys, the cranked shaft, and the pitman, arranged with the slider, the wheel shaft, and the hopper, in manner, and to operate with an endless band or cord, substantially as specified.

83,152.—MANUFACTURE OF SHOT.—William Glasgow, Jr., and John G. Wood, St. Louis, Mo.

We claim, 1st, The method herein described of producing shot, consisting substantially in dropping the metal, in a molten state, through a column of glycerin, oil, or other similar fluid, instead of air.

2d, The heating of said column at or near the top, so that the molten shot shall first impinge upon the heated portion of the medium, and be quickly cooled by its descent into the cooler portion of the same.

3d, The employment of an adjustable heating apparatus, so arranged and operating as to impart heat to any desired part of the cooling column, substantially as and for the purpose set forth.

4th, The construction of the cooling reservoir with a lateral branch for the withdrawal of the shot, substantially as herein shown and described.

83,153.—BILLIARD TABLE.—Karl Gudenoge, San Francisco, Cal.

I claim the construction of a billiard table by the arrangement of the longitudinal slats, a a, transverse slats, b b, longitudinal rails, c c c, and alternate wide boards or pieces, d d d, placed edgewise, and held by the transverse bars, e e e, or equivalents, substantially as and for the purpose described, in combination with the papier maché or pasteboard bed, A, applied and prepared as specified.

83,154.—COMBINED PLOW AND HARROW.—Jacob Haessel, St. Louis, Mo

I claim the arrangement of the harrows, D, with the plow, A B, in the manner shown and described.

83,155.—CORN HARVESTER.—John D. Hampshire, Paper Mills Post Office, Md.

I claim, 1st, The circular saw or cutter, E, perforated with holes, k, and arranged in connection with the spring bar, O, bar, Q and discharging bar R, to operate in the manner substantially as and for the purpose set forth.

2d, The bow, U, connected with the discharging bar, R, and arranged to operate in connection therewith substantially in the manner as and for the purpose set forth.

3d, The reel, M, in combination with the circular saw or cutter, E, arranged to operate substantially as and for the purpose specified.

4th, The combination of the saw or cutter, E, reel, M, spring bar, O, bar, Q, discharging bar, R, and bow, U, all arranged to operate in the manner substantially as and for the purpose set forth.

83,156.—AUGER HANDLE.—T. C. Hendry (assignor to himself and R. B. Smith), Union Point, Ga.

I claim the combination of the socket, A, formed by two tubes, a and b, crossing each other, with the handle, B, made adjustable in the socket, b, and the auger shank, c having a ratchet thereon, extending up through the tube a, and handle, B, all constructed and arranged substantially as and for the purposes herein specified.

83,157.—FASTENING FOR CHECK HOOKS AND TERRETS.—A. L. Hill, Decatur, Ill.

I claim the screw, B, with a flat head, D, having its corners, a, turned upwards, and used for connecting the terret or check hook, A, when said terret or hook is provided with a female screw in the shank, all substantially as herein shown and described.

83,158.—SEEDING MACHINE.—Frank A. Hill, Marysville, Cal.

I claim the frame, A, provided with the shares or teeth, A, in combination with seed box, D, provided with the toothed shafts, E E, rotated in opposite directions from the wheels, B B, and also provided with the fixed and adjustable perforated plates, e e', all arranged to operate in the manner substantially as and for the purpose set forth.

83,159.—RAILROAD AXLE.—George H. Hoagland, Port Jervis, N. Y. Antedated October 19, 1868.

I claim a wrought iron axle, constructed with steel journal casings, extending about midway into the eye of the wheel, substantially as and for the purposes specified.

83,160.—TOY.—John L. Holt, Providence, R. I.

I claim, 1st, The toy, consisting of the self-sustaining pendulum, A B C, and of the figures or images, E E, having loose swinging limbs or parts, F F, attached thereto, so that constantly varying pictures and positions are produced, substantially as described.

2d, The pins, c, when provided with the fastening arms, d, and when secured to the images, E, to suspend the limbs, F, as specified.

3d, The disk, D, when provided with a sock t, or with its equivalent, the spring, g, and when so arranged that figures or images, E, can be easily fastened to and removed from it, as specified.

4th, The manner herein shown and described of fastening the sustaining plates, G, to the figures, E, by cutting pointed pistons, h, out of the former, and fastening them to the figures, as set forth.

5th, The manner herein shown and described of suspending the members, F, from the figures, E, by fastening tubes, I, to the figures, and pins, J, to the members and securing and arranging all as herein shown and described.

83,161.—FEED WATER HEATER FOR STEAM BOILERS.—B. A. Hopkins, Scotia, N. Y.

I claim the exhaust pipe, C e, and cold water pipe, E, in connection with tank, D d s, constructed, arranged and operating as herein shown and described, and for the purpose set forth.

83,162.—STEAM GENERATOR. — Frank M. Horning, East Pike, N. Y.

I claim, 1st, The scroll sheets, n, in combination with the fire box, A, and air vessel, B, whereby the air from the latter is heated before being discharged into the fire box, substantially as herein shown and described.

2d, The port, J, constructed as described, and containing the fuel box, K, in combination with the pipes, L N, fire box, A, and air vessel, B, operating substantially as described, to supply fuel to the fire box.

3d, The hot-air pipe, V, having the cap, 1, and perforations, 2, arranged with relation to the furnace, A and pipe, F, whereby to separate the ashes from the heated gases, so that the former will not be forced into the generator, substantially as herein shown and described.

4th, The arrangement of the hot air pipe, V, within the water supply pipes, whereby the former is protected by an annular sheet of water, substantially as herein shown and described.

5th, The spiral blades, x, arranged as described, within the generators, D E, whereby the heated gases are deflected as they enter the generator, substantially as herein set forth and shown.

83,163.—VENTILATING FRUIT HOUSES.—J. S. Houghton and Charles B. Rees, Philadelphia, Pa.

We claim the combination and arrangement of the open spaces or flues, B, in the walls, A, with the preserving room, B, and ventilated loft, D, substantially as described.

83,164.—HARVESTER.—Henry Howe, Oneonta, N. Y.

I claim the pinions, a b, hung loosely on the ends of the counter shaft, E, and connected respectively with the sliding spring clutches, c d, or their equivalents, and meshing into the internal gearing of the driving wheels, C and D, respectively, the pinion, a, on the opposite side of the cutting apparatus, being smaller than, b, substantially as described, for the purpose of balancing the strain of the machine and for allowing it to cut when it turns a corner, as specified.

83,165.—VAT FOR CYLINDER PAPER MACHINES.—Amasa Howland, Sandy Hill, N. Y.

I claim, 1st, The construction of my improved vat, for the purpose and in the manner above set forth and described.

2d, The introduction of the pulpy fluid in such a manner as to create currents across the under or lateral surface of the gathering cylinder, substantially in the manner and for the purpose above described.

83,166.—CHIMNEY COWL.—B. Irrgang, Philadelphia, Pa.

I claim a ventilator or cowl, having inclined edges, and shields projecting from the cowl at the sides of the doors, all substantially as and for the purpose described.

83,167.—MODE OF PUTTING UP STARCH FOR USE.—Alexander Irwin, Madison, Ind.

I claim forming the wet starch into cubical packages, of uniform size and equal weight, as a new process of manufacture.

83,168.—SAW FILING MACHINE.—D. H. Iseminger, McLean, Ill.

I claim the construction and arrangement of the bar, a, swivel mechanism, d e e, slotted plate, f, guide rod, g, arm, h, and file stock, k n l, all operating as described, in connection with the saw clamps, B B, for the purpose specified.

83,169.—STEAM GENERATOR.—Ralph H. Isham, Brooklyn, N. Y.

I claim the construction and combination of the box distributer, B, and tube, C, with the boiler, A, substantially as set forth.

83,170.—CARRIAGE SPRING.—John Jackson, Owego, N. Y.

I claim the combination of the twist of steel, the circular arm, the strap or chain for the arm to play on, the ratchet wheel and lever to adjust or change the power of the spring to carry either a light or heavy load.

83,171.—VAPOR BURNER.—W. W. Jacobs, Hagerstown, Md.

I claim, 1st, The annular wooden disk, C, secured between metallic plates, h i, to the generator, F, as herein shown and described, whereby the said generator may be adjusted without inconvenience from heat, the heat radiating from the parts E F, not being conducted by the disk, C.

2d, The lamp burner, constructed as described, and consisting of the generator, F, perforated at, J, wick tube, E, annular wooden disks, B C, and metallic plates, h i c d, all arranged and combined to operate in the manner and for the purpose set forth.

83,172.—MACHINE FOR MOLDING, ROUNDING, AND CHANNELING SOLES OF BOOTS AND SHOES.—Albert Jeffers, Lynn, Mass.

I claim, 1st, The combination, in an organized machine, of mechanisms for molding and channeling and rounding a sole, under the arrangement, and for operation, substantially as herein set forth.

2d, As a means of molding a sole, the combination of the molding block, w, and the supporting last or bed, z, the former being supported by and swiveled to the sliding frame, b, and operated by the cam groove, u, or its equivalent, and the latter provided with a series of points or spurs, b bi, etc.; the whole being substantially as hereinbefore referred to and explained.

3d, For actuating the movements of the sliding frame, b, the combination of the weight or its equivalent, applied as described, with the cam groove and the tripper, s, essentially as explained.

4th, In combination with the cam groove and tripper last mentioned, the employment of the deflector, n2, applied and operating in manner and for the purpose as before explained.

5th, For effecting the alternate movements of the screw, and as a consequence the reciprocating movements of the bed, the employment of the two semi-clutches, h1 h2, operating in connection with a collar, g1, revolved by the endless belts, k1 l1, and adjusted and controlled by the shipping bar, m1, and its adjuncts, for the purpose as hereinbefore referred to and explained.

6th, In combination with the last described arrangement of parts, the employment of the locking bolts, r2, actuated by a suitable device, the purpose of such bolts being as before explained.

7th, The head stock of the machine, as composed of the segmental dovetailed block, s1, the supporting lever plate or carriage, t1, the plate or carriage, v1, the swiveling plate, x1, the carriage, z1, and the tool carrier, g2, under the general combination and arrangement as before alluded to and described.

8th, The mode of applying the carriage, z1, to the swiveling plate, x1, before described, that is, by means of the coiled springs, a3 a3, applied to the shaft, as explained, the latter being provided with the lever or handle, in manner as before set forth; and, in combination with the springs, a3 a3, shaft, c2, and handle, e2, the employment of the bent spring, f2, in manner and operating as before explained.

9th, I claim applying the cutter head, n2, to its supporting carriage, in such manner as to turn it into a vertical position, or to remove it from contact with the bed, x, essentially as described.

10th, In combination with the swiveling plate, x1, the employment of the friction rollers, y2 y2, for the purpose of maintaining the cutting knife, k2, parallel to the edge of the bed, x, as before explained.

84,173.—SCREW SOCKET FOR BRUSH HANDLES.—Wm. H. Johnson, Philadelphia, Pa.

I claim a cast screw socket having a flange, a, ears, c c, and longitudinal ribs, e, to be inserted in the body of the brush, substantially in the manner hereinbefore described, and for the purpose specified.

83,174.—CARRIAGE BRAKE.—Samuel D. Kimble, Allegheny City, Pa.

I claim the disk, A, and notched wheel, A2, with the levers, B and B', when connected with the hub, A, and axle tree, R, as described, in combination with the crank lever, D, levers, C and C', strap, E, cords, E1 and E2, and neck yoke, G, with its devices, when constructed, combined, and arranged, substantially as herein described and for the purpose set forth.

83,175.—HORSE HAY FORK.—Jesse B. Kurtz, Davisburg, Pa.

I claim the center tine, A, provided with the side tines, C C, in combination with the knife, H, constructed substantially as shown and described, and operating as and for the purposes herein set forth.

83,176.—RAIN-WATER CUT OFF.—Robert S. Laird and Wm. F. Stone, Sandwich, Ill.

We claim the combination and arrangement of the hinged pipe, C, slide, D, and flanged plate, F, provided with two nozzles, m m, all constructed, arranged, and operated for a direct lateral movement, in the manner and for the purpose set forth.

83,177.—METHOD OF WELDING TIRES.—Isaac Lamplugh, Peoria, Ill. Antedated October 3, 1868.

I claim the combination of the tire, A, provided with a V-shaped notch at each end, within which is inserted a diamond shaped plug, B, which is welded to and forms a part of the tire, in the manner and for the purposes set forth.

83,178.—FRUIT GATHERER.—Chas. F. Lang, Venedy, Ill.

I claim the combination of the head piece, A', hooks, a, sliding head, C, hooks, c, guides, D, operating handle, E, and pouch, B, substantially as and for the purposes set forth.

83,179.—MANUFACTURE OF CARD CLOTHING.—Ed. S. Lawrence, Worcester, Mass.

I claim, 1st, Card clothing, made or composed of a series of teeth set in paper backs, A, in a moistened state, and then dried, substantially as and for the purposes set forth.

2d, Card clothing made or composed of a series of teeth set in wet or moistened paper backs, and then the sides of the backs subjected to pressure while the drying operation is completed, substantially as and for the purpose set forth.

3d, Card clothing, made or composed of a series of teeth, C, set in moistened or wet paper backs, in the manner above described, whereby the teeth are supported by elevations or gums, b, substantially as shown in the drawings.

83,180.—HAND SEED DRILL.—Wm. Ledlie and Geo. L. Gray, Jefferson, Ill.

We claim, 1st, The combination of the oscillating seed hopper, C, having the feed roller, E, therein, with the tube, c, having the funnel, d, attached, and the furrow opener, D, all constructed and arranged substantially as described.

2d, The V-shaped opening in the hopper, with the slides, f and l, arranged to operate substantially as and for the purpose set forth.

83,181.—TURNING LATHE.—Stephen R. Lewis, Rockford, Ill.

I claim the combination and arrangement of the tool rests, F and I, with the cutting tools secured thereto, with segment wheel, K, and pinion, K', and racks, J and L, the whole constructed substantially as described and operating as and for the purpose set forth.

83,182.—PRINTING CERTAIN TEXTILE FABRICS AND YARNS.—John Lightfoot, Lower House, near Burnley, England.

I claim, as novel, the making of blue and green colors from this and the previously-described solutions, in such a manner that the indigotine remains combined or mixed with such a small proportion of tin that none, or nearly none, is fixed in the fiber by the subsequent processes, and consequently that there is no tin lake found with the dye stuff, to spoil the purity of the blue and green.

I am aware that carbonate of potash has, most probably, been used to fix fast blue and green made with indigo and tin, but I am not aware that it has been used to fix aluminous and ferruginous mordants at the same time, and I therefore claim the use of carbonate of potash for fixing simultaneously indigotine colors and mordants intended for dyeing.

I am also aware that alkaline silicates have been used to fix mordants intended for dyeing, and that even they have been proposed to be used cool, and stronger than in the usual way of using them as cow dung substitutes, but what, to the best of my belief, has not been done is the simultaneous fixing of ordinary mordants and indigotine colors by alkaline silicates, and I therefore claim their use for this purpose, to whatever manner they may be employed.

83,183.—SHIFTING BUGGY TOP.—Thomas Lodge, New Lisbon, Ohio.

I claim the spring levers, G G, in combination with screw hook, F, button or head, F', handle, B, frame, C, standards, B, and angle irons, E, on seat, A, all constructed to operate in the manner substantially as described.

83,184.—FENCE.—Obadiah Love, Saxenburg, Pa.

I claim the fence above described, consisting essentially of the rails, A A, posts, B C, hasps, D D, and staples, E E, all said parts being constructed and combined together in the manner and for the purposes set forth.

83,185.—DIVIDER FOR HARVESTERS. — Joseph J. Lurvey, North Prairie, Wis.

I claim the described divider when constructed of the bifurcated part and the vibrating cutting arm, the whole being attached and operated substantially as and for the purpose set forth.

83,186.—ROTARY STEAM ENGINE.—W. I. Lyman, Springfield, Mass.

I claim the arrangement of the ports, B and B', on each side of the chest, with the four armed piston hinged centrally, and head, C, substantially as herein shown and described.

83,187.—ROTARY CULTIVATOR.—Stephen Mahurin assignor to himself and William Montgomery), Clayton, Ill.

I claim, 1st, The rotary toothed shafts, C, two or more, in combination with the reciprocating toothed bar, E, operated from one of the shafts, C, substantially as and for the purpose set forth.

2d, The combination of the reciprocating toothed bar, E, with the slot, g, in the front side of the hopper, F, and the adjustable slide, h, attached to the pivoted frame, Fx, all arranged substantially in the manner as and for the purpose specified.

3d, The harrows, H H, attached by hinges or joints, j j, in combination with the rotary toothed shafts and the seed-distributing apparatus, all arranged substantially as and for the purpose set forth.

83,188.—PISTON FOR STEAM ENGINES.—H. N. J. Mansfield, Malone, N. Y.

I claim the construction of the piston head for horizontal cylinders, with the projection lip, A, and indention, A', near its periphery, whereby to obtain upward pressure of steam, all substantially as herein set forth.

83,189.—WHEEL BARROW.—E. B. Marshall, Atlanta, Ga.

I claim the springs, D, made of wood, iron, steel, or other suitable material, and attached to vehicles of any description, substantially as and for the purposes herein set forth.

83,190.—STATION INDICATOR.—E. B. Marshall, Atlanta, Ga.

I claim the movable and reversable rim, A, when so arranged, with the names of the different stations inscribed upon it, and in combination with a clock, that said clock will show at a glance when the train or conveyance is due at any or all stations on the road, substantially as and for the purposes herein set forth.

83,191.—BRICK MACHINE.—James Martin, Jersey City, assignor to Henry Martin, Keyport, N. J.

I claim the arrangement and combination of the rock shaft, Ex, spring pawl, H, lever, D*, and G, and rods or connections, h C*, with the lever, I, substantially as shown and described for the purpose specified.

83,192.—APPARATUS FOR STORING PETROLEUM.—Ignace Mathei, Antwerp, Belgium.

I claim, 1st, The herein-described method of storing or warehousing petroleum, mineral oils, and other liquids, by the employment of a series of inclined planes, arranged in a reservoir or basin of water, substantially in the manner shown and set forth.

2d, An apparatus for warehousing petroleum and other like liquids constructed substantially in the manner herein described.

83,193.—INSTRUMENT FOR ATTACHING BUTTONS TO FABRICS.—Herrman Mauch, Providence, R. I.

I claim the arrangement of a spring, B, with a side opening in the jaw, operating substantially as and for the purpose specified.

Also, the combination of the sliding die, C, with its spring, F, and the spring, B, substantially as described.

83,194.—DOUBLE-BARRELED FIRE ARM.—Edward Maynard, Tarrytown, N. Y.

I claim two or more separate gun barrels, so united and attached together, by means of a projecting ring, plate, staple, or other equivalent device, firmly secured to one barrel, and embracing or entering the adjacent barrel, or a lug or plate projecting therefrom, as to allow any one of them to expand and contract longitudinally, independently of the other, without changing or affecting the relative position of their axes, substantially as herein set forth.

83,195.—BRACKET AND RACK.—William A. Middleton, Harrisburg, Pa.

I claim the combination of the bracket, S M B, with the two series of arms, a a' b b' c c', d d', with or without the hooks, as and for the purpose specified.

83,196.—BEAM AND GIRDER.—James Montgomery, Croton Landing, N. Y. Antedated October 10, 1868.

I claim, 1st, A beam or girder, formed with heads, A A, connected, by converging shoulders, C C, to a web, B, which tapers from both heads toward its mid-width or transverse center, substantially as and for the purpose explained.

2d, Jointing together two or more of my improved beams, in substantially the manner herein described, so as to make them mutually support each other.

3d, The flanges, D, for supporting the flooring, F, in the manner specified.

4th, In combination with a beam or girder, constructed as set forth in the first clause, the bolt or key, H b, applied and operating as explained.

83,197.—FARM GATE.—Peter Mougey, Marshallsville, Ohio.

I claim, 1st, The operating gate plate, M, when constructed with a central hole, of the same shape and nearly the same size as the cross section of the gate post, C, and used around said gate post, and in combination with the rods, L K, and carriage levers, I I', J J', substantially as and for the purpose herein specified.

2d, The peculiar arrangement and combination of the latch, E, with arm, F, the rod, G, double crank rod, a H b, and a gate plate, M, the several parts being constructed and arranged as shown, and used in combination with the gate, C A B D, and latch post, P, substantially as and for the purpose herein specified.

88,198.—COCKLE AND GARLIC SEPARATOR.—J. W. Neal, and A. J. Truxell, Big Lick, Va. Antedated October 9, 1868.

We claim the arrangement of the cylinders, B B, having perforated metal faces, upon the frame, A, in such a manner that one end of each cylinder is elevated above the other, so that the grain will pass from the hopper, C, down in between the cylinders, and pass down the inclined plane thus formed, all constructed and used as specified.

83,199.—HOT AIR ATTACHMENT TO COOKING STOVES.—John Norris, Mount Pleasant, Md.

I claim, as an attachment to a "ten plate" stove, the oven door, constructed with a bay, E, and collar, E', and having connected therewith the pipe, F, provided with the caps, e m, the whole operating in the manner and for the purposes specified.

83,200.—MACHINE FOR MOLDING SHEET METAL WINDOW AND DOOR CAPS.—Joseph Parkin, and James H. Smith, Cleveland, Ohio.

We claim the adjustable auxiliary roller, K, rollers, C C', adjustable standards, B, and guide, L, all combined and arranged to operate in the manner as and for the purpose set forth.

83,201.—MODE OF BINDING THE EDGES OF REIN HOLDERS.—Louis J. Parsons, New Bedford, Mass.

I claim the metallic frame, B2, for binding the edges of "reinholes" in carriage boots and horse blankets, and securing the flap which covers the front of rein hole in boots, made and applied substantially in the manner shown and described.

83,202.—ADJUSTABLE MUSKETO BAR FRAME.—Louis J. Parsons, New Bedford, Mass.

I claim a metallic musketo bar frame, in combination with springs and screws, as herein set forth and described, for the purpose specified.

83,203.—WHIP SOCKET.—Louis J. Parsons, New Bedford, Mass.

I claim making whip sockets in longitudinal sections, connected together at the bottom by springs or hinges, and held together at the top by an elastic band, as herein set forth and described.

83,204.—THILL GUARD.—Louis J. Parsons, New Bedford, Mass.

I claim the metallic safety guard, C, for thills of carriages, constructed and operating substantially as and for the purpose set forth and described, and applied in any practical manner.

83,205.—MODE OF FASTENING APRON HOOKS TO THE DASHER FALLS OF CARRIAGES.—Louis J. Parsons, New Bedford, Mass.

I claim securing hooks or rings to "dasher falls" by metallic clasp, B2, substantially in the manner described.

83,206.—PLOW.—Yarnall Rakestrow, Whitehouse, Ohio.

I claim the point, F, and cutter, F, in combination with standard, C, substantially as set forth.

83,207.—ROLLING HORSE SHOE BLANKS.—Abram Reese, Pittsburg, Pa.

I claim, 1st, Dispensing with the collar on the rolls, which, in machines heretofore made, confine the inner edge of the shoe blank, by arranging the prints, i i, one or more, and collar, b', on a smooth-faced roll, A', and without any confining collar, in the manner shown and described.

2d, The arrangement of the part collar, d, and prints, e, alternately with each other, on the face of the roll, and opposite to the full collar, b, so as to limit the spread of the iron at the heel parts of the blank or bar, and at the same time permit the free spread of the iron over the prints, e, at and near the toe parts of the blank or bar, substantially as hereinbefore set forth.

83,208.—MACHINE FOR SOLDERING SHEET METAL BOXES.—C. L. Rehn, Philadelphia, Pa.

I claim the concave disk, F, arranged to revolve above a series of gas burners, or equivalent heaters, as and for the purpose herein set forth.

83,209.—MACHINE FOR MAKING METAL BOXES.—C. L. Rehn, Philadelphia, Pa.

I claim, 1st, Hinging the machine at a a, so that it may be turned to either a vertical or horizontal position, for the purpose described.

2d, The standard, p, rendered adjustable upon the frame of the machine, as described, so that its levers, J and K, may be adjusted to suit the size of the cylinder upon which they are caused to bear.

3d, The lever, K, with its spring, t, and blade, u, when operated by the lever, J, as described.

4th, The bar, I, secured to the frame of the machine, and rendered adjustable upon the same, in the manner and for the purpose set forth.

5th, The adjustable flanged guide blocks, m m, for the purpose specified.

6th, The lever, H, when actuated by a spring, K, as described.

83,210.—MANUFACTURE OF GLASS WARE.—Daniel C. Ripley, Birmingham, Pa.

I claim the construction of a compound mold for making articles of pressed glass ware, substantially as described, in which the pressing fount shall itself be a mold, and shall at the same time be connected by a sprue or sprues with another mold, or with other molds, for forming the same or other articles of glass ware.

83,211.—TOY PISTOL.—Ezra Ripley, Troy, N. Y.

I claim the combination of the striking lever, A, belt spring, B, and stud or support, C, for the belt spring and lever, with the stock, D E, and barrel or projectile holder, F, with or without a sliding follower, G, therein, all constructed and arranged to operate substantially as and for the purpose herein set forth.

Also, the combination of a trigger catch, H, striking lever, A, belt spring, B, stud, C, stock, D E, and projectile holder, F, with or without a follower therein, all constructed and arranged to operate substantially as herein described.

83,212.—TRAVELING BAG.—William Roemer, Newark, N. J.

I claim a frame for traveling bags or valises, being bulged at n and m, to form, in combination with plates, v and w, attached on the under side recesses or bearings for staples, A or B, to relieve the lock from strain, as described, constructed and arranged as herein specified.

83,213.—NUT.—Benj. D. Sanders, Wellsburg, W. Va.

I claim a metallic nut for screw bolts, having a concave or conical depression in the lower face, around the eye, substantially as and for the purpose described.

83,214.—NUT.—Benj. D. Sanders, Wellsburg, W. Va.

I claim, 1st, A metallic nut for screw bolts, having a body of square or other polygonal shape, with a cylindrical collar on its lower face, and a conical or concave depression around the eye, substantially as hereinbefore described.

2d, A metallic nut for screw bolts, having one or more recesses or steps around the eye, with a concavity or depression on its lower face, substantially as and for the purpose described.

83,215.—WATER CLOSET.—D. Schilling, Brooklyn, N. Y.

I claim a water closet, privy, or other seat, when provided with a receptacle or receptacles for a deodorizing or disinfecting agent or agents, in combination with an arrangement of mechanism substantially as herein described, by which such disinfectants can be discharged into the chamber or space about the bowl, etc., or into it, substantially as and for the purpose described.

83,216.—SWING.—Benj. F. Shaffer (assignor to himself and Wm. K. Young), Dayton, Ohio.

I claim the permanent arms, E E, the pivoted arms, D D, and treadle, F, constructed, arranged, and operating substantially as described and for the purpose specified.

83,217.—CARRIAGE SPRING.—T. J. Shears, Ypsilanti, Mich.

I claim the combination of the springs in the form described, composed of the coil springs, F, or rubber springs, G, with the subsidiary springs, H, when arranged substantially as herein described.

83,218.—WASH BOILER.—Pius L. Shepler and Samuel L. Irwin, Whitehouse, Ohio.

We claim the perforated sliding extension tube, E, in combination with the chambers, B, the grated false bottom, J, provided with button, G, and the lugs, H, on the boiler, A, substantially as and for the purposes set forth.

Also, the ears, C, in connection with the chambers, B, and the pit bottom of the boiler, A, substantially as described.

And the combination of all the above named parts with the faucet, I, when arranged and operating substantially as and for the purposes herein specified.

83,219.—TUCKING DEVICE FOR SEWING MACHINES.—R. H. St. John, Bellefontaine, Ohio.

I claim, 1st, The pressure gage plate, C, applied to the free end of a hinged handle, B, substantially as and for the purpose described.

2d, The pressure gage plate, C, on the hinged handle, B, in combination with the folding plate, D, substantially as described.

3d, The pressure gage, C, on the hinged handle, B, in combination with an adjustable guide, f, and a folding plate, substantially as described.

4th, The vertically adjustable gage plate, C, constructed with an extension guide, c, upon it, in combination with a shoulder, s, and extension guide, f, formed on a base plate, A, and a horizontally adjustable slide, D, substantially as described.

83,220.—BIRD TRAP.—James S. Stone and Geo. W. Chamberlin, Fitchburg, Mass.

We claim, 1st, The combination of the case and its catch mechanism with the spring, B, and noose, C, the whole constructed and operating in the manner and for the purposes above set forth and described.

2d, The beveled surface, J, for the purpose of throwing up the noose, C, substantially as set forth.

83,221.—ORE SEPARATOR AND CONCENTRATOR. — Richard Dunn Symons, John Tremelling Harry, and Samuel Stephens, Grass Valley, Cal.

We claim, 1st, In combination with the pan or tub, A, and chamber, H, the yoke, B, provided with stirrers or agitators, D D D1, and annular ring, D2, or their equivalents, substantially as and for the purpose described.

2d, The hollow vertical shaft, F', and driving shaft, F, with a half round opening, in which the half round depending spindle, E, of the yoke sets, substantially as described, for the purposes set forth.

3d, The pins, L L, on the gear I I', which operate the hammer, the weighted arm, M M, and the hammers, N N, the whole constructed and arranged to operate substantially as and for the purpose described.

83,222.—MANUFACTURE OF STEEL INGOTS.—Jno. Blake Tarr, Fair Haven, Mass.

I claim forming a hollow ingot under pressure, as herein described.

83,223.—CAST-STEEL TIRE.—John Blake Tarr, Fair Haven, Mass.

I claim, 1st, The machine for making a compressed steel car wheel tire substantially as described.

2d, As a new and improved article of manufacture, a compressed steel tire for a car wheel, made separate from, and adapted for being shrunk upon, the central portion of such wheel, substantially as described.

83,224.—STEAM ENGINE.—John Blake Tarr, Fair Haven, Mass.

I claim 1st, the mode of working an engine by steam which is reheated after it leaves the boiler, and when cut off from the boiler by the action of the pump, substantially as described.

2d, A pide or pipes leading from the steam boiler to the valve chest of an engine through a furnace, and provided with a forcing pump which is operated by said engine, substantially as described.

3d, In combination with a steam pipe, C, leading direct from a boiler to an engine, and provided with a cut-off valve, I claim the means for taking steam from said pipe, C, superheating it, and then conducting the superheated steam to the valve chest of said engine, substantially as described.

83,225.—SCREW BOLT.—Frederick Tudor, Boston, Mass.

I claim the within described screw bolt as an article of manufacture.

83,226.—WROUGHT IRON COLUMN. — George Walters and Thomas Shaffer, Phœnixville, Pa.

We claim an improved wrought iron or steel column, of which the shaft is formed by the combination of the ring bands, A, skewback bars, B, and binding bars, C, with each other, said parts being constructed and arranged and joined to the base and capital, substantially as herein shown and described and for the purpose set forth.

83,227.—HEAD REST.—Malon Warne, Philadelphia, Pa.

I claim the combination of a curved rod or bow, B, a padded strip, A, secured at the ends to the ends of the bow, and a strap secured to the bow, and adapted for attachment to the ceiling of a car, for the purpose specified.

83,228.—POLICEMAN'S MACE.—Mahlon Warne, Philadelphia Pa.

I claim, 1st, A mace, having a rigid handle or stem of metal, and a hollow head of india rubber, or other elastic material, filled with shot, or its equivalent.

2d, The combination of the tubular handle, A, sliding rod, B, its head, D and enlargement, d.

83,229.—SABOT.—Mahlon Warne, Philadelphia, Pa.

I claim, 1st, The T-shaped strip, k, secured at two of its ends to a plate, A, and having in the other end an opening, for the reception of a button on the plate, substantially as and for the purpose described.

2d, A strip, D, of cloth, or equivalent fabric, secured to the plate, A, in the manner described.

83,230.—WASHING MACHINE.—George R. Weber, Springfield, Ill.

I claim the combination of standard, B, fixed to the side of the tub, A, lever, C, adjustable rod, D, rigid fingers, E E, used in connection with a common tub, and so arranged that clothes may be elevated and drained by the fastening device, F E.

83,231.—CONCENTRATOR FOR DRESSING ORES.—Henry Weston and George C. Langtry, Dayton, Nevada.

We claim, 1st, A copper lined table, D, with a longitudinal depression, O, and imparting to the said table a rectilinear alternate motion by means of the crank pin, K, working in the curved slot, J, or their equivalents, substantially as and for the purpose described.

2d, The manner of suspending the table to the rock shaft, and adjusting shaft, by the hangers, F F, jointed arms, G G, and the beam, I, for operating the said rock shaft, substantially as described.

3d, The shackle rod, M, attached to the arm, L, of the adjusting shaft, for raising and lowering the edge of the table, and the springs, T T, constructed and arranged to operate substantially as and for the purposes specified.

83,232.—STOVE GRATE.—George D. Woodworth, Chicago, Ill.

I claim, 1st, The combination of the rotating independent center, E, whether provided with teeth, d, or not, with a grate, A, arranged to operate substantially in the manner herein described.

2d, In combination with the rotating center, E, a stirrer or flange, H, to operate substantially as and for the purposes set forth.

3d, Constructing the teeth, b, with slots, c, substantially in the manner and for the purposes herein specified.

4th, Providing the rim, A, with a wire edge, a, as and for the purposes shown and described.

83,233.—POST AUGER.—Calvin Adams, Pittsburg, Pa.

I claim a post auger, with one or more plows, constructed and arranged on the arms, and operating substantially as and for the purpose shown and described.

83,234.—KING BOLT AND WHIFFLETREE PLATE FOR VEHICLES.—Levi Adams, Amherst, Mass.

I claim the two plates, constructed as described, the one, A, provided with the parallel flanges, a a, semi-annular groove, b, and opening, c, the other, B, provided with the parallel flanges, d d, semi-annular ledge, e, projection, f, tubular pendant, g, and reach extension, h, all arranged and operating as described for the purpose specified.

83,235.—DRAG BAR FOR CULTIVATOR.—Clark Alvord, Courtland, Wis.

I claim, 1st, The compound drag bar, as above described and shown.

2d, The construction of the cultivator tooth, and fastening it to the drag bar by passing the bolt through the angle, as above described and shown.

3d, The movable clasp, in combination with the drag bar, as above described and shown and for the purpose above set forth.

83,236.—OUTLINE MAP TO TEACH GEOGRAPHY, ETC.—E. F. Anderson, Mansfield, Conn.

I claim the construction of an outline map, and the names of different divisions or parts thereof, so that the said names may be attached or detached, substantially in the manner as herein set forth.

83,237.—ELEVATOR FOR BUILDINGS.—James S. Baldwin, Newark, N. J.

I claim the automatic elevator, constructed and applied as and for the purpose set forth.

83,238.—HARROW.—W. H. Barry, Rabbit River, Mich.

I claim, 1st, The combination of the overlapping guard bars, B and E, with with the forward ends of the parts, D and A, substantially as herein shown and described and for the purpose set forth.

2d, The described arrangement of the curved metallic bars, C C, and straight bars, F, with relation to each other, the central part, A, of the harrow, the wings, D, and guards, B E, as herein described, for the purpose specified.

83,239.—APPARATUS FOR THE MANUFACTURE OF ILLUMINATING GAS.—John A. Bassett, Salem, Mass.

I claim, 1st, In an apparatus for carbureting air, the disk, C, made of wood, floating upon the surface of the hydrocarbon liquid and partially immersed therein.

2d, The disk, C, having radiating channels formed upon the under surface, for the purpose substantially as described.

83,240.—BAG TIE.—J. W. Bates, Glencoe, Minn.

I claim the arrangement of the wooden block, A, having the holes, a1 a2, and the slot, a3, terminating in the hole, a2, with the cord, C, all applied to the bag in the manner herein described and shown.

83,241.—VALVE ARRANGEMENT FOR ORGANS.—Moritz Baumgarten, Jr., New Haven, Conn.

I claim the valves, P R S, in number corresponding to the number of wind chests, constructed in the manner described and arranged and fixed upon the valve rod, L so as to be operated in their respective chambers, substantially in the manner herein set forth.

83,242.—RAILWAY SWITCH.—Hiram Beckwith, Grass Lake, Mich.

I claim, in combination with a switch lever, C, the bell crank, G, with the weight, h, and pin, i, arranged substantially as described, for the purposes set forth.

83,243.—MACHINE FOR DRESSING MILLSTONES.—William Bold, Sheboygan Falls, Wis.

I claim the combination of the pick block holder, E, and pick block, D, having the adjustable pick plates, H, and removable cap, G, with each other and with the adjustables frame, A B, substantially as described, for the purpose specified.

83,244.—BRICK MACHINE.—Geo. C. Bovey, Cincinnati, Ohio.

I claim, 1st, The arrangement of the pulverizers, M and M', and screen, N, in combination with the mold wheels, B C, of a brick machine, in the manner and for the purposes described.

2d, The arrangement of the fixed cam, I, having wings, I' I'', and flanges, J J', in combination with a series of plungers, E, having rollers, H, and outwardly-projecting shafts, h, for the object herein stated.

3d, In combination with the mold wheels, having radial compartments, D, and shoulders, d, the gravitating and weighted rollers, P, and cell cranks, p, substantially as herein set forth.

83,245.—WHEEL FOR VEHICLES.—R. J. Bowman, Mansfield, La.

I claim, 1st, The tubular rim, A, composed of two parts, constructed and fitted together in the manner substantially as and for the purpose set forth.

2d, The flat spokes, C, secured to the hollow rim, A, by means of the bent ends, e, angles plates, f, bolts, dx, and grooved blocks, g, and to the hub ring, D, by means of the cylindrical keys, i, and chambers, hx, substantially as herein shown and described.

3d, The combination of the rim, A, tire, B, spokes, C, and the hub, composed of the ring, D, and box, E, all constructed and arranged substantially as and for the purpose specified.

83,246.—GAS FIXTURE.—Nathaniel L. Bradley and John A. Evarts (assignors to Bradley and Hubbard), West Meriden, Conn.

We claim, as an article of manufacture, gas fixtures, the shell or ornamental part of which is formed of two parts of cast metal, one part being provided with a lip or lips, a, to cover the joint and form a rib, substantially as and for the purposes specified.

83,247.—CIGAR MACHINE.—Richard A. Bright, Jr., Providence, R. I.

I claim, 1st, A cigar machine, consisting of the stationary frame, A, carrying rollers, B C; of the swinging frame, E, carrying the rollers, F G H; of the header, J, follower, L, and cutter, O, all made and operating substantially as and for the purpose herein shown and described.

2d, The sliding follower, L, fitted to the end of the spindle, D, and made yielding by means of the spring, t, substantially as described, and operating for the purpose specified.

3d, The header, J, formed on a pin, p, and having the lips, r, as set forth for the purpose specified.

4th, The cutter, O, formed on the swinging weighted lever, N, substantially as set forth, the same being adjustable on the frame, E, as described for the purpose specified.

88,248.—SHUTTER AND BLIND OPERATOR.—Wm. E. Brooke, Trenton, N. J.

I claim the worm gear, C D, arm, E, slide, F, and slide bar, G, dove tail, b b, or their equivalents, when constructed, arranged, and combined substantially as and for the purposes herein described.

83,249.—COMPOUND FOR THE CURE OF DROPSY.—C. Brown, New Albany, Ind.

I claim a compound, or medicine, composed of the above mentioned ingredients, and used substantially as and for the purposes herein set forth.

83,250.—CHAIR SEAT.—H. Buchter, Louisville, Ky.

I claim the combination of the bent canes, B, grooved seat, A, and strip, C, as herein described, for the purpose specified.

83,251.—WASH BOILER.—John H. Burtis, Brooklyn, N. Y.

I claim the removable plates, e f, applied to a wash boiler, substantially as and for the purposes specified.

83,252.—CAR COUPLING.—W. E. Bush, Damascus, Pa.

I claim the springs, d d, with their shoulders, f f, and the lip, h, on the draw head, substantially as and for the purposes herein shown and described, in combination with a draw head of a car coupling.

83,253.—HAND STAMP.—N. C. Chamberlain, Boston, Mass.

I claim, 1st, The combination, with a die in a hand stamp, of three type wheels of equal diameter, each provided with exposed figures or letters upon their sides, substantially as and for the purpose set forth.

2d, Securing the saddle or type wheel holder to the plunger, by means of a screw bolt, substantially as and for the purpose specified.

3d, Constructing the saddle or type holder with flanges, l l, as and for the purpose described.

4th, The type wheel, n, provided with figures upon its side, when the said wheel is constructed and arranged between two wheels of equal diameter, as and for the purpose set forth.

5th, The type wheels, m and n, when the same are constructed and combined together, as and for the purpose described.

6th, The arrangement, whereby one detent serves to secure in position two of the type wheels, as specified.

83,254.—WASHING MACHINE.—C. F. Chambers, Hutsonville, Ill.

I claim, 1st, The peculiar construction of the said board, namely, the inclined and yielding frame, D, supported in front on springs, E, and at back on or near the tub bottom, and having hinged to its front and upper edge, the series of concave corrugated and yielding fingers, G, whose lower ends are supported on springs, I, in combination with a vibrating rubber.

2d, The yielding and swinging frame, K, having the double rubber, L L', and handle, P, in combination with a yielding concave board, substantially as set forth.

83,255.—GRAIN DRYER.—L. S. Chichester, Brooklyn, N.Y.

I claim a grain dryer, formed with air tubes running through the grain space, and opening at both ends, substantially as specified, whereby a current of air causes a circulation of the mass of grain during the drying operation, substantially as set forth.

83,256.—HEAD BLOCK FOR CARRIAGES.—T. M. Cluxton, Rising Sun, Ind.

I claim, in the T-shaped head block, A B, for carriages, the combination of the recessed extension arm, B, with the supporting plate, D, and braces, E E, arranged as herein described and set forth.

83,257.—BEE HIVE.—A. V. Conklin, Bennington, Ohio.

I claim, 1st, The square or angular case, B, folding roof or doors, D, when said case is elevated upon the vertex of the angle of its sides, in the manner as and for the purpose specified.

2d, The angular frames, F, when arranged within the case, B, so that the vertex of the angles of said frames shall coincide with the vertex of the angles of the case, in the manner and for the purpose set forth.

3d, The honey boxes, G G', frames, F, doors, D, and case, B, combined and arranged, in relation to each other, in the manner and for the purpose substantially as described.

83,258.—SEAT LOCK FOR CARRIAGES.—Wm. Conway, Rushville, N. Y.

I claim the bolt, b', provided with the tongue, b'', in combination with the sliding key, c, and the socket, a, as and for the purpose set forth.

83,259.—CULTIVATOR.—Wm. Custer, Shannondale, Ind.

I claim a shield or fender attachment to a plow, constructed and operating substantially as herein specified, and for the purposes mentioned.

83,260.—WASHING MACHINE.—G. A. Dabney, San Jose, Cal.

I claim the reversible rubber, G, constructed as described, in combination with the side bars, F, swing bars, D, and removable rubbing platform, K L, substantially as herein shown and described, and for the purpose set forth.

83,261.—BIT STOCK.—Benj. Darling, Bridgewater, Mass.

I claim, in combination with a bit stock, the sliding jaws, B B, whereby a bit or auger is fastened to the stock, substantially in the manner herein shown and described.

83,262.—SAWING MACHINE.—R. B. De Bare, Philadelphia, Pa.

I claim the arrangement of the half pinion, U, with its reciprocating double rack, V, guide, Y, with its adjustable lever, G, grooved frame, C, guide plates, D D, and wood racks, K K, with their curved rack lever, L, when combined and operating with the adjustable cross cut saws, B B, as herein described and for the purposes set forth.

83,263.—BEE HOUSE.—Chas. Decker, New Michigan, Ill.

I claim the bee house, constructed as described, and divided into compartments, a b, by the central partition, c, each compartment adapted to receive the lower part the suspended comb frames, b E, above which the ordinary hive, D, is placed, supported on slats, b, and communicating with the entrance, g, by means of the board, b', as herein shown and described.

83,264.—APPARATUS FOR BOILING EGGS.—Ira Dimock, Florence, Mass.

I claim, 1st, The use, in an apparatus for boiling eggs, of a fluid, surrounded by a slow heat conducting material or air cavity, substantially as described, in combination with a bell or other sonorous annunciator, the striking hammer of which is actuated to strike the same, from the expansion of the said fluid, all as set forth.

2d, The use of a fluid in a case arranged to act, by expansion, on a piston or diaphragm, which will transmit movement, so as to release a catch and ring a bell, and substantially as shown and described, and for the purpose set forth.

3d, An egg-boiling apparatus, when constructed substantially as herein shown and described.

4th, The combination, in an egg-boiling apparatus, of an egg receptacle, a1, of any suitable form, with a case, b, inclosed by another case, c, to retard the penetration of heat to a fluid within the inner case, substantially as described.

83,265.—ICE-CREAM FREEZER.—James Dooling, Boston, Mass.

I claim, 1st, The means herein described of coupling the cream holders and beaters to the operative mechanism, and uncoupling the same, by giving to the sleeve shafts, O O, and the spindles, S S, a vertical motion up or down, by means of the lifting bar, P, and the levers, Q, or their equivalents, substantially as described.

2d, The within described arrangement of mechanism, or its mechanical equivalent, for controlling the operation of the cream holders and beaters, so that the cream holders may be made to rotate while the beaters remain inoperative, or the beaters may be rotated while the cream holders remain inoperative, or both the cream holders and the beaters may be rotated at the same time in opposite directions, substantially as described.

3d, The combination, with the two separate trains of gearing for transmitting the motion of the vertical driving shaft, G, to the cream holders and beaters, of a locking device for each, substantially as described.

4th, Forming the interior of the ice tank, so that its surface shall be approximately concentric to the exterior of a group of cream holders, substantially as described.

5th, Mounting the ice tank and contents upon a carriage moving on rails, in combination with stationary driving mechanism, operating substantially as described.

6th, The guides, Z Z, and the locking bolt, Y, in combination with an ice tank mounted on a carriage, substantially as described.

7th, The central beater wings, h h, attached to either side of the beater shaft, and curved partially around said shaft, parallel to its axis, when so constructed and applied that a free passage for the cream is left between its edge and the walls of the cream holder, substantially as described.

83,266.—SASH FASTENER.—John H. Douglass, Meriden, Conn.

I claim the follower, F, bolt, E, and lever, I, combined with the roller, L, and incline, C, when constructed and arranged to operate in the manner and for the purpose substantially as described.

83,267.—FILLING FORKS FOR LOOMS.—William G. Duce, Baltic, Conn., and Albert C. Eddy, Providence, R. I.

We claim the combination, with the filling fork, having tines of india-rubber, or other flexible and elastic material, of the protecting metallic shields, c c, substantially as described.

83,268.—WATER CHARGER FOR PUMPS.—Thomas Dutton, and Thomas Maguire, Port Jervis, N. Y.

We claim, 1st, The arrangement of the channels, b and c, in relation to the body of the charger, as herein recited.

2d, The charger, a, with its channels, b and c, and port or hole, f, all substantially as shown and described.

83,269.—BUGGY TOP FASTENING.—Daniel S. Early, Hummelstown, Penn.

I claim the jointed bars, M, in combination with the arm, n n, and sockets, o o, as and for the purpose described.

83,270.—REEL.—John S. Fenner, Warren, R. I., assignor to Inman Manufacturing Company.

I claim the hinged arm, C', applied and retained in position, as described, in combination with the immovable arms, C, and the pulley, A, all constructed in the manner and for the purpose described.

83,271.—COMBINED CORN PLANTER AND SHOVEL PLOW.—A. M. Franklin, W. J. Hastings, and J. A. Holford, Rising Sun, Ind.

We claim, 1st, The combination of the hopper, K, wheel, O, lever, N, bar, S, and box, T, all constructed as described, and supported by the cross bar, H, and bar, I, substantially as and for the purposes herein set forth.

2d, A double shovel plow, in combination with a movable corn planter, when both are constructed substantially as herein described, and operating as and for the purposes set forth.

83,272.—CAR COUPLING.—Jesse P. Freeman, Dalton, Ga.

I claim, 1st, The arrangement of two beaks or hooks, b b', upon a single draw head, in the position relatively with each other, substantially as shown and described, and for the purpose specified.

2d, The combination of a link, D, having the toe, n, and operating as described, with a rock shaft, E, supported by the end of the car above the draw head, and having attached to it a curved serrated arm, I, and a rope or crank for moving it, the whole operating together in the manner substantially as described, and for the purpose set forth.

83,273.—TONIC BITTERS.—Frank Fullerton, Williamsport, Pa.

I claim the within-described compound for tonic bitters, made of the ingredients and in the proportions as above set forth.

83,274.—CONSTRUCTION OF PICK AXES.—Morgan Gale, San Antonio, Mexico.

I claim the detachable socket, C, constructed with a base, c1, with or without the side or brace flanges, c2, in combination with the pick head, B, substantially as herein shown and described, and for the purpose set forth.

83,275.—LUBRICATOR FOR STEAM ENGINES.—George Girty, Rainier, Oregon.

I claim the two valves, L I, pipes, B E, oil chamber, D, and lever, F, all constructed and arranged to operate in the manner substantially as and for the purposes set forth.

83,276.—BINDING MERCANTILE BOOKS.—John H. Gleim, St. Louis, Mo.

I claim the combination of a journal or entry book, B, with the press copying book, A, into one volume, substantially as herein shown and described and for the purposes set forth.

83,277.—WASH BOILER.—S. A. Goodwin, Buffalo, N. Y.

I claim, 1st, In a wash boiler, the separation and collection from the washing solution of the dirt discharged from the articles washed, automatically, by subsidence or deposition, by means of an elevated pan or pans, E, or their equivalents, placed at some point or points on the line of circulation, as set forth.

2d, The plate, B, with its two rims and the settling pan, E, combined, substantially as and for the purposes described.

83,278.—WASH BOILER.—S. A. Goodwin, Buffalo, N. Y.

I claim, 1st, In connection with wash boilers of the class above mentioned, the filtration of the washing water automatically, as herein set forth.

2d, The inclined imperforated plates, D, bars, b', plates, B, and rim, g, combined together and arranged with the boiler, A, and pipe or pipes, C, substantially as and for the purpose described.

83,279.—METHOD OF DESTROYING INSECTS IN TREES AND PLANTS.—H. A. Graef, Brooklyn, N. Y.

I claim the described process of exterminating caterpillars, and measure worms, consisting in forcing a stream of water containing chloride of lime against the tree in which the insects are found, as herein shown and described.

83,280.—COMPOUND FOR DESTROYING INSECTS.—Martin Haas, New York city.

I claim the compound admixture in the proportions specified and for the purpose set forth.

83,281.—EGG HOLDER.—F. R. Harbaugh, Philadelphia, Pa.

I claim the the within described egg holder, composed of a base, A, two elastic arms, B and B', and two sections, D D, of a cup, or the equivalent to the same, the whole being constructed and arranged substantially as and for the purpose herein set forth.

83,282.—CHIMNEY.—Samuel Hoke, Mount Pleasant, Md.

I claim, 1st, The combination of the self-acting chambers, M, with the guides, K, when constructed with and operated by means of the vane, N, as herein described and for the purpose set forth.

2d, Also, an iron tubular chimney in sections, with a fire place, A, radiator, B, reel, P, cleaners, M, and vane, N, when constructed, combined, and operated as herein described and for the purposes set forth.

83,283.—GANG PLOW.—H. R. Huie, Hayward's, Cal.

I claim, 1st, Securing the arm, e, of the axle, f, to the axletree, a' by means of the eye bolt, i, as shown and described.

2d, The crank bolt, q, in combination with the eye bolt, r, for adjusting the tongue, as herein set forth.

3d, The arrangement and construction of the plate, l, ears, m, and boxes, n, which allows of their being cast as one piece, as herein described.

83,284.—ENVELOPE FOR NEEDLES.—Arthur James, Redditch, England.

I claim a needle case or wrapper made from a blank, formed and folded as herein described, and illustrated in the accompanying drawings.

83,285.—TRUNK HANDLE.—G. B. Jenkinson, Newark, N. J.

I claim, 1st, The sockets or plates, C C, constructed with the hollow shoulders or elevations, a a, with an aperture or opening between them, arranged and operated substantially as and for the purpose set forth.

2d, The clasps or plates, D D, provided with projections, d d, working in the sockets or plates, C C, as and for the purpose set forth.

83,286.—WINDOW BLIND.—Wm. Johnston, Cincinnati, Ohio.

I claim, 1st, The through cylindrical rod, B, fixed rigidly in the stiles, as an axle for a slat in window blinds, shutters, doors, and lower windows or openings to turn upon, substantially as herein described.

2d, The metallic slat, when formed with a tubular or hollow spine, running longitudinally through the same, and made to turn on the said cylindrical rods.

3d, The bushings, D, when provided with the annular flange, d, adapted to form a washer at the end of the slat, for the purpose specified.

83,287.—WHIP SOCKET.—John Julien, Christiansburg, assignor to himself and John F. Horr, Springfield, Ohio.

I claim a whip socket constructed with a lock, D, having a spring bolt, D', and flexible chain, C, notched curved piece, C1, and spring, C2, arranged to operate in combination, substantially as set forth.

83,288.—DUMPING PLATFORM.—S. C. Kenaga, Kankakee, Ill.

I claim the arrangement and construction of the floor, B, dumping platform, C, rods, X, and hub rings, y', lever, K, shaft, S, hasp, p', dogs, M, lever O, and trap door, Q, in combination with posts, A G and I, axle, D, caps, F, friction roller, S', fulcrum, L, rest, N, spout, T, and bin, P', substantially in the manner and for the purposes herein shown and described.

83,289.—APPARATUS FOR CARBURETING GAS.—Joshua Kidd, New York city.

I claim, 1st, The combination of intercepters, as H I, or any other suitable form or construction, interposed between the carbureting vessel, A B, and the burners of the same, to screen the heat from the lower part of the said vessel, and deflect it so as to act on or near the surface of the contained oil or carbureting fluid, all substantially as shown and described, and for the purpose set forth.

2d, The reflecting lip, d, substantially as described, in combination with the carbureting vessel, A B, and interceptor, H I, all as set forth.

83,290.—WEEDING HOE.—Lewis King, Oriskany Falls, N. Y.

I claim the weeding hoe substantially as herein shown and described, as a new article of manufacture.

83,291.—STEP LADDER.—M. C. Longacre, Cleveland, Ohio.

I claim the slotted metallic plate, b c, in combination with a step ladder, substantially as and for the purpose described.

83,292.—SASH HOLDER.—Samuel L. Loomis (assignor to himself and Charles E. Walter), Byron, N. Y.

I claim the traversing slide, B, arranged in a groove in the side or edge of the sash, with the mortises, D, in said groove, with inclined bottoms, and the rubber or elastic rollers, arranged in the mortises, as described.

83,293.—BUTTON HOLE CUTTER.—A. J. Lytle, West Union, Ohio.

I claim the slotted plate, E, in combination with the slotted jaw, B, of a button hole cutter, as hereing described, for the purpose specified.

83,294.—HOLD BACK FOR CARRIAGES.—John A. McKinnon, Cleveland, Ohio.

I claim, 1, The loop, F, and yoke, D, arranged at right angles to each other, or nearly so, the latter passing around hook, B, and provided with the bar, having arms, E, substantially as and for the purposes set forth.

2d, The continuous band, I, attached to the hook, in combination with the key, J, and shaft, B, substantially as and for the purposes set forth.

3d, The loop, F, and yoke, D, provided with the cross bar and arms, E, in combination with the hook, B, and tongue, C, substantially as and for the purpose set forth.

83,295.—SAFETY VALVE.—William R. Malone, Mason City, West Virginia.

I claim the arrangement of the safety valve, B, exhaust pipe, D, provided with pipe connections, communicating with the furnace, the extension tube, C, and boiler, A, substantially as described.

83,296.—DITCHING MACHINE.—John Marsh, Seneca, Ill. Antedated September 29, 1868.

I claim, 1st, The combination of the lever, G, shaft, F, roller, H, and apron, I, with the lever, L, plow, K, apron frame, J, and shoe, M, substantially as and for the purpose described.

2d, The combination of the wheels, C C', frame, A, beam, K, double brace, N, guide, O, and brace, P, substantially as and for the purpose described.

83,297.—BRICK MACHINE.—Henry Martin, Keyport, N. J., assignor to James H. Kenick, New York city.

I claim, 1st, The plunger, I, constructed in sections, essentially as described by combining with the main plate or body of the plunger, loose end bars, r r, and a front plate or bar, u, adjustable, relatively to the main body, substantially as and for the purpose or purposes herein set forth.

2d, The application to the rod, G, to which the spring hook is attached, of the turn buckle, U, in the manner and for the purposes set forth.

83,298.—GRAIN WEIGHING AND TALLYING MACHINE.—F. S. McWhorter, St. George's, Delaware.

I claim, 1st, The sleeve, V, and choking plate, W, or the equivalent thereof, in combination with the steelyard, J, weight, K, sack holder, L L T, and spout, A, all substantially as shown and described, and for the purpose set forth.

2d, The steelyard arm, J, having a rigid connection with the choking plate, W, and loose connection with the sack holder, L L T, or its equivalent all substantially as and for the purpose shown and described.

3d, The sack holder, L L T, or its equivalent, in combination with the steelyard arm, J, weight, K, and spout, A, for the purpose of thrusting in a plate, W, to shut off the flow of grain, substantially as shown and described and for the general purpose set forth.

4th, The band, Q, and clips, f f, substantially as shown and described, in combination with the plates, L, all as and for the purpose set forth.

5th, The catch lever, b, and spur wheel, d, constructed and operating as shown and described, in combination with the choking plate, W, and any tallying mechanism, all as and for the purpose set forth.

6th, The arrangement of the tallying mechanism, consisting of the shaft, k, bearing the worm, l, gear, h, and pointer, a', the shaft, i, provided with the worm, j, and spur wheel, d, the pinion, g, and pointer, a, on shaft, m, all combined to operate as set forth, in connection with the weighing mechanism.

83,299.—PROCESS OF PRESERVING POTATOES.—Josiah Mumford, Clarksburg, Ohio.

I claim the above described process of preserving potatoes, viz., by dusting or sprinkling them with lime, and then packing them away in a composition of lime and loam or sand, as herein described and represented.

83,300.—CONSTRUCTION OF METALLIC SPOONS.—Frederick G Nienringhaus, St. Louis, Mo.

I claim a metallic spoon, fork, or similar utensil, provided with a handle, concaved or dished longitudinally on the upper side thereof, being curved from edge to edge, substantially as set forth.

Also, folding over and bending outwardly the edges of a fork, spoon, or similar utensil, at the juncture of the handle with the head or bowl thereof, substantially as herein set forth.

83,301.—COAL HOD.—Frederick G. Nedringhaus and William F. Niedringhaus, St. Louis, Mo.

We claim, 1st, A coal hod bottom, stamped up out of an unbroken piece of sheet metal, when provided with an upwardly-projecting flange, formed to receive, encircle, and embrace the lower edge of the body of the hod, substantially in the manner and for the purpose herein set forth.

83,302.—VALVE FOR PUMP.—John A. Nichols, Paterson, N.J.

I claim the valve case, A A', in combination with the valve, B, constructed and arranged to operate as described.

83,303.—RAILWAY RAIL JOINT.—Geo. Palmer, Littlestown, Pa.

I claim, 1st, The fish piece, C, lapping the rail joint, B, its upper surface as high as the level of the top of the rail, in length sufficient to rest upon two or more ties, and secured to said ties, independent of the fastenings of the rail.

2d, A wooden fish piece, provided with a metallic plate on its upper surface, lapping the rail joint, B, substantially as and for the purpose set forth.

3d, A fish piece, lapping the rail joint, B, and constructed with the grooved ends as shown and described, for the purpose of enabling the cars to regain the track, after having been thrown therefrom, as set forth.

83,304.—HARVESTER.—Isaac H. Palmer, Lodi, Wis.

I claim the combination of a reel, having the cross bar, N, as described, with the tilting platform, operated by the cross bar at every revolution of the reel, substantially in the manner described and shown.

83,305.—CARRIAGE STEP.—Geo. Panchot, Hastings, Minn.

I claim the attachable and removable carriage step, constructed substantially as above described.

83,306.—MORTISING MACHINE.—Francis Parker (assignor to himself and C. W. Ormsby), Petaluma, Cal.

I claim the gaze rod, B, with the slides, D E F G, or their equivalents, together with the stops, R S T U V W, when constructed substantially in the manner and used for the purpose above described.

83,307.—WASH BOILER.—W. N. Peirce, West Boylston, Mass.

I claim the combination with the boiler, of the inclined and perforated base, F, and its central tube, supported upon legs or standards above the bottom of the boiler, in the manner described, so that a continuous space, c, shall intervene between the periphery of the base and the sides of the boiler, as and for the purposes set forth.

83,308.—MEAT CUTTER.—John G. Perry, Kingston, R. I.

I claim the curved or hollow plate, D, with openings, made substantially as described, for the purpose of holding the knives of a meat cutter.

83,309.—CONDENSER.—William Phelan, Peoria, Ill.

I claim, 1st, A central crowning cone, C, applied within the cones, J F, so as to form a condensing chamber, B, surrounded by a cool water chamber, F', substantially as described.

2d, Cones, C F, connected by a concavo-convex bottom, E, when these cones are arranged substantially as and for the purposes described.

3d, The jacket, J, and its concavo-convex bottom, G, with the cones, C F constructed and arranged substantially as described.

4th, The valve T, arranged with relation to the internal extension of feed pipe, D, substantially as described.

5th, The deflecting pipe, U, applied over the condenser, in combination with outlets, a, through the feed pipe, D, substantially as described, and for the purposes set forth.

6th, The arrangement of outlet pipes, O, with relation to chamber, F', and the outer jacket, J G, substantially as described.

7th, The arrangement of the valve, R, with relation to chamber, B1, and passage, S, substantially as described.

8th, The valve, T, arranged with relation to the internal extension of feed pipe, D, substantially as and for the purposes described.

9th, The deflecting plate, U, applied over the condenser, in combination with the outlets, a, through the feed pipe, D, substantially as and for the purposes described.

83,310.—IRONING TABLE.—James T. Piercy, Martinsburg, Ohio.

I claim the supporting frame, F, bar or support, e, standards, A A, and ironing board, d, all constructed and arranged substantially as set forth.

83,311.—PULVERIZING LAND ROLLER.—Frederick Post, Piano, Ill.

I claim the roller, A, in combination with the scraper, B, markers, C, sills, K K, cross bars, L L, bearings, G, and tongue, E, all constructed and operating substantially as described.

83,312.—FANNING MILL.—James P. Preston, Monroe, Wis.

I claim, 1st, The frame, M, hung to the faces, A A, by the metallic strips, as described, in combination with the spiral springs, substantially as described.

2d, The combination of the spout, z, and screens, K and L, the latter being provided with the door, a, and button, a', as and for the purposes set forth.

83,313.—FRUIT DRYER.—J. Walter Pyne, Danville, Ill.

I claim the combination of the perforated drawers, with the surrounding steam spaces, each one of which spaces is provided with an induction pipe, substantially as shown and described.

83,314.—CORN SHELLING MACHINE.—Joshua S. Rackham, Waterport, N. Y.

I claim, 1st, A hollow toothed corn shelling cylinder, composed of yielding segmental sections, substantially as and for the purpose described.

2d, The combination, with the same, of the cylinder, n, substantially as and for the purpose described.

3d, The combination, with the cylinder, H, and shell, S, of the screen and fan blower, substantially as and for the purpose described.

83,315.—STRAW CUTTER.—Ellery P. Ralph, and James Hannan, Gallipolis, Ohio.

We claim, 1st, The eccentric cam wheel, E, collar and lever, c and d, and

guide, b, to which the knife, F, is attached, in combination with the frame, D, constructed substantially as described, and operating as and for the purposes set forth.

2d, The shaft, e, crank, f, lever, g, crank lever, h, rod, g', lever, i, and pawls, i' and j, in combination with wheels, k' and k, and rollers, m m, substantially as described, and operating as and for the purposes set forth.

83,316.—REFRIGERATING HOUSE.—Thos. L. Rankin, New Richmond, Ohio

I claim, 1st, Ice follower, h, constructed and operating substantially as and for the purposes described.

2d, The combination of ice floor, c, and pans, e, e', operating together for the purposes explained.

3d, The combination of ice floor, c, and follower, h, operating together substantially as and for the purposes explained.

83,317.—VARNISH.—Isaac Ranney, Delaware, Ohio.

I claim, 1st, The varnish compounded substantially as above described.

2d, The process herein set forth of making the above described varnish.

83,318.—FASTENER FOR COLLARS AND NECKTIES.—Emanuel Rau, New York city.

I claim the stud, A, having an inclined side slot, g, as described, in combination with the pointed arm, d e, doubled or jointed at f, and having both a forward and lateral spring, when the parts are constructed to operate substantially as described.

83,319.—ELEVATOR.—John Jay Rea, Cadiz, Ohio.

I claim the beam, A, hooks, B B, forked truck, C, provided with wheels, D D and E, trigger, L, pulley, E, cords, G K I, and weight, H, all combined and operating substantially as herein set forth.

83,320.—STEAM SAFETY VALVE.—Geo. W. Richardson, Troy, and Henry Watrman Hudson, N. Y.

We claim, 1st, The lock-up bar or arch, J J, constructed substantially as shown and described.

2d, The construction of the branch or escape passage, N, substantially in the manner shown and described, it being so arranged as to prevent tampering with the valve or its adjustments.

3d, The combination of the valve, A, spring, C, spider, D D, cap, H, and lock-up bar, J J, substantially as shown and described.

4th, The arrangement of the branch escape passage, N, with reference to the valve, A, and spring, C.

5th, The arrangement of the lock up bar, J J, with reference to bolts, I I, substantially as shown and described.

6th, The arrangement of the spider, D D, with reference to the spring, C, substantially as shown.

7th, The combination of the overhanging valve, A, spring, C, spindle, E, and spider, D D, or its equivalent, substantially as shown and described.

83,321.—RAILWAY CAR BRAKE.—Martin H. Rumpf, Paris, France. Patented in France Oct. 17, 1867.

I claim the combination with a brake suspended as described, of a sliding or rotating shaft, or a chain for raising and lowering the brake, either the shaft or chain being operated by any suitable mechanism, substantially as herein set forth and shown.

83,322.—MACHINE FOR SHARPENING THE CUTTERS OF MOWING MACHINES.—Gelston Sanford, Bergen Point, N. J.

I claim, 1st, The combination, with the holding bed, I, of a reciprocating grinder, arranged for adjustment relative to one another, substantially as and for the purpose set forth.

2d, The combination, with the holding bed, I, of the adjustable arms, L, substantially as and for the purpose described.

3d, The combination, with the bed, A, of the holding bed, I, and reciprocating stone, D, substantially as and for the purpose set forth.

4th, The bed, B provided with the ways, C, trough, B, and sponges, Q, substantially as and for the purpose set forth.

5th, The arrangement of the sliding stone, D, connecting rod, G, crank shaft, H, and stone, P, substantially as and for the purpose set forth.

6th, The combination, with the reciprocating stone, D, of the presser wheel, O, substantially as and for the purpose set forth.

83,323.—DINNER PAIL.—Moritz Saulson, Troy, N. Y.

I claim the combination of the pail, A, inner vessel, B, arranged in the upper part of the pail, pan, C, in the upper part of the inner vessel, and cover, D, extended down outside of the pan, inner vessel, and pail, as herein described.

Also, the combination, with the pail, A, and inner vessel, B, of the removable wire spring, K, and groove or grooves, L, formed and arranged substantially as and for the purpose herein set forth.

Also, the combination, with the pail, A, and outside surrounding cover, D, of the notches, r r, and wire-like spring bail, N n, formed and arranged substantially as and for the purposes herein shown and described.

83,324.—SAWING MACHINE.—F. M. Schaeffer, Blooming Grove, Kansas.

I claim, 1st, The arrangement of the guides, M M, and springs, m m, with relation to the guides, G, and the saw, whereby said guides, M, move independently of each other, to press upon the log being sawed, as herein described, for the purpose specified.

2d, The guides of a reciprocating saw, supported on an adjustable oscillating plate or support, K, substantially as and for the purpose described.

3d, The combination, with the plate, K, and the saw guides, of the lazy tongs, I, for the purpose of connecting the guides to the oscillating plate, and admitting of the rising and falling motion required by the saw in its passage through the log, substantially as and for the purpose described.

4th, The swinging block support, Q, arranged as described, in combination with the log bed, substantially as and for the purpose described.

83,325.—WASHING MACHINE.—Jerome Scott, Charleston, Pa.

I claim the swinging bucket, D, as arranged and connected, by means of the arms K, with the press board, H, and operated by the levers, F, and handle, E, substantially in the manner and for the purposes herein shown and described.

83,326.—HORSE RAKE.—Nicholas Selby, Flora, Ill.

I claim, 1st, The arrangement of the hinged frame, c, carrying the revolving rake within the rectangular balanced frame, a a a a, all constructed and combined to operate substantially as and for the purposes herein shown and described.

2d, The notched trip stick, r, when hinged to the front cross bar of the frame, a, and combined with a spring, w, whereby said stick, r, is actuated downward, and held in contact with the rake head, as herein shown and described.

3d, The described arrangement of the pivoted lever, k, link, l, and stirrup link, n, with relation to the rectangular balanced frame, a, and hinged rake frame, c, as herein shown for the purpose set forth.

83,327.—PIE TIE.—Nancy M. Sheldon, Chatham, Conn.

I claim, as an article of manufacture, the cone-shaped tube, A, provided near its lower edge with a series of holes, a a, substantially as and for the purposes herein set forth.

83,328.—INKSTAND.—Wm. G Shattuck, Boston, Mass.

I claim the combination, with the ink well and its metallic case and cover, applied to a desk or like article, in the manner described, of a nut, E, arranged to hold said ink well and case in place, substantially as herein set forth.

83,329.—WASH BOILER.—Allen Sherwood, Auburn, N. Y.

I claim, in a clothes washer, the wooden perforated float, B, provided with a metal flange, C, tubes, I I, and, at its center, with a circular hole, covered covered with wire gauze, over which hole is placed a tapering cylinder, D, provided at its upper end with a circular perforated box, E, all constructed and operating substantially as and for the purposes herein set forth.

83,330.—STOP MOTION FOR WARPING MACHINE.—J. Siegrist, New York city.

I claim, in combination with the weights, G, suspended on or from the yarns, the balanced frame, H I J and K, arranged for operation by said weights, revolving shaft or drum, L, provided with a lifter, f, and belt shifter for throwing the yarn beam out of gear, all for action together, substantially as specified.

83,331.—SPINDLE FOR SHUTTLES.—C. E. Smith (assignor to himself, J. S. Jaques, and F. T. Jaques), Lowell, Mass.

I claim a split shuttle spindle, notched or serrated on both sides, or on its entire circumference, substantially as and for the purposes set forth.

83,332.—DEVICE FOR FASTENING SHIRT COLLARS.—P. W. Smith, Chicopee Falls, Mass.

I claim the combination of the plate, A, necks, a and b, with oblong and circular flanges, B and C, and pin, D, the parts being constructed and arranged substantially in the manner and for the purposes set forth.

83,333.—SOFA BEDSTEAD.—B. L. Southack, New York city.

I claim the seat, D, sliding in grooves, s, of the arm rests, B, and hinged at its rear edge to the back, E, which back is held up to the arm rests, B, by the catches, e, and projections, f, all operating as described, whereby the back is turned down into a horizontal position and then drawn forward into the grooves, s, with the seat, D, until arrested by the projection, f, whereby a continuous bed bottom is formed, as herein shown and described.

83,334.—COMBINED SEEDER AND CULTIVATOR.—Lucus Stadler, Bowen, Ill.

I claim, 1st, The knives, G, constructed and operating substantially as and for the purposes set forth.

2d, Combining in one machine the knives, G, the seed-sowing box, D, the sod breakers, F, cultivator plows, K, and harrow, O, substantially as specified.

3d, A seed sowing cultivating, and harrowing machine, having seed box, D, cylinder, E, cranks, a a, pitmen, b b, cranks, d, sod breakers, F, knives, G, roller, H, pins, n, plows, K, lever, h, and harrow, O, constructed and arranged substantially as specified.

83,335.—BEE HIVE.—Upton Stansbury, Plymouth, Ind.

I claim, 1st, The breeding boxes, C C, closed at their sides and ends, and slotted at the top and bottom, and provided with small glass windows and entrances, and connected to the cleats, c c, of box, A, by means of their grooved sides as herein set forth.

2d, The arrangement of the outside box, A, with the breeding boxes, C C, honey boxes, D D, and slide screens, a and n, substantially as and for the purposes herein set forth.

83,336.—BALANCE SLIDE VALVE.—William M. Stevenson, Sharon, Pa.

I claim a steam valve, constructed as described, with a cavity, A, between the walls, as, and with packing strips, s s, in grooves on the top of the walls as, steam being admitted through holes, t t, under said strips, pressing them up against the cap of the steam chest, substantially as and for the purpose herein set forth.

83,337.—WEATHER-BOARD GAGES.—W. E. Stoddard, Fort Edward, N. Y.

I claim the combined weather-board gage and scribe, consisting of arms, A B, slide, E, the spur-pivoted block, H, hinged bar, I, sliding block, J, and slotted hole, K, all constructed and arranged to operate as herein shown and described.

83,338.—CORN PLANTER.—D. F. Taft, New Bedford, Mass

I claim, 1st, The rock shaft, J, levers, g l, and disk, e, in combination with the cords, h i, section, M, angular lever, H, and cam, L, attached by a rod to the disk, e, all operating as described, whereby the partial rotation of the rock shaft throws the seeding device out of gear, and folds back the discharge spout simultaneously, substantially as herein shown and described.

2d, The hinged section, M, of the jointed spout, in combination with the pin, i, notched bar, F, and spring, B, all made and operating so that the section will be yielding, even if in the working position, as set forth.

3d, The cam, D, levers, I H, and spring, K, all operating as set forth, so as to move the seed slide, F, back and forth, the cam being connected with a revolving ratchet wheel, a, by means of a pawl, b, so that it will be out of gear when the machine moves backward, as specified.

4th, The wedge, L, connected with a crank or disk on the rock shaft, J, substantially as described, and operating so as to throw the lever, I, off the cam D, when the machine is to cease dropping seed, as set forth.

83,339.—ATTACHMENT FOR SKATES.—F. T. Thurston, Providence, R. I.

I claim the shoe, A or B, with the protecting strip, a, constructed substantially in the manner described for the purpose specified, irrespective of the method employed to secure its attachment to the skate.

83,340.—SHIELD FOR CORN PLANTER.—R. T. Taylor, Everton, Ind.

I claim, 1st, The adjustable shield, B, constructed and attached to the plow in the manner described, and operated by means of the slotted arms on the stay, c, and the lever, D, substantially as and for the purposes herein set forth.

2d, The ratch bar, g, in combination with the bent spring, h, for the purpose of holding the lever, D, at any point desired, thereby adjusting the shield, B, substantially as and for the purposes herein set forth.

83,341.—POCKET DRINKING CUP.—J. S. Towndrow, Moline, Ill., assignor to W. P. Humphrey, Davenport, Iowa.

I claim a pocket goblet, consisting of the cup, A, and stand, B, constructed so that they may be detached, and the cup connected to the stand in a reversed position, substantially as herein described.

83,342.—HORSESHOE MACHINE.—Enoch B. Turner, Providence, R. I.

I claim, 1st, The arrangement and combination of the adjustable gage, L, knife holder, M, adjustable knives, T and S, adjustable burring gage, N, spring, t, and slotted bar, K, as herein set forth and for the purposes described.

2d, The combination of the anvil, F, mandrels, I I, pads, J J, squeezing cam levers, E E, forks, k k, and springs, j j, all arranged as herein set forth and for the purposes described.

3d, The combination of the above devices with the cranks, b b, adjustable shafts, B B, saddles, A A, saddle bars, A' A', spurs, m m m m, axle g g, adjustable connecting rods, P P, rollers, D D, slotted cam formers, G G, former rollers, H H, and adjustable rollers, i i, as herein set forth, all arranged and combined so as to form a complete machine for making horseshoes, as described.

83,343.—SPRING ADJUSTER.—J. D Van Hoevenbergh, Kingston, N. Y.

I claim the improved spring adjuster above described, its several parts being arranged and operating together, substantially as herein specified.

83,344.—GAS MACHINE.—Hugh Wain, Ravenna, Ohio.

I claim the arrangement of the cylinder, A, tank, C, provided with induction and exhaust pipes, and having the space, H, filled with a poor conducting material, in combination with the perforated bottom and gasometer, D, as and for the purpose substantially as described

83,345.—BINDING MATHEMATICAL BOOKS.—F. B. Wells, Fishkill on the Hudson, N. Y.

I claim the insertion of these silicated leaves in the aforementioned works in which they may be used, said leaves to be bound in the book firmly, inserting any number desired, according to the nature and the size of the volume, or they may be simply fastened in any way, that they may be removed, changed, or replaced, or new ones inserted, at pleasure, if so thought to be more practicable.

83,346.—JET ATTACHMENT FOR SODA FOUNTAINS.—J. C. Wharton, Nashville, Tenn.

I claim an attachment for soda-water fountains, when constructed of a plane surface, A, having a border pipe, B, provided with jet tubes, a a a, etc., drain pipe, b, and supply pipe, d, all substantially as and for the purpose set forth.

83,347.—MACHINE FOR BENDING SHEET METAL.—A. W. Whitney and P. A. Whitney, Woodstock, Vt

I claim, 1st, The folding bar, H, in combination with the bars, J J, arms, P P, and connecting rods, Q, all arranged to operate in the manner substantially as and for the purpose set forth.

2d, The straps, M, in combination with the folding bar, H, adjustable bearings, I, and screws, O, all arranged to operate in the manner substantially as shown and described.

3d, Holding the folding blade, C, upon the work or bed piece, B, through the media of the cams, l, friction rollers, L, and bars, D e, all arranged to operate substantially as set forth.

4th, The gage, E, arranged and applied in connection with the screw, F, substantially in the manner as and for the purpose set forth.

83,348.—COUNTER SINK.—P. A. Whitney, Woodstock, Vt.

Antedated Oct. 16 1868.

I claim the herein-described improved counter sink, when constructed substantially as and for the purpose described.

83,349.—LATHE CHUCK.—D. E. Whiton, West Stafford, Conn.

I claim the construction and arrangement of the back plate, P, with openings, b b b, and projection, E, with sockets, a a a, when connected with the rack, B, of a geared chuck, substantially as and for the purpose herein shown.

83,350.—EXTENSION TABLE.—F. R. Wolfinger and Joseph Barrett, Chicago, Ill.

We claim an extension table consisting of a central frame, A, having the side rails cut away to form recesses, F, to receive the attachable top boards G, and having the extension frames connected thereto by the hinged bars, H, all constructed and arranged to operate as set forth.

83,351.—STEAM HEATING.—George M. Woodward, New York city.

I claim the cap, C, secured upon the pipe, B and provided with a perforated diaphragm, b, from which the tube, D, is suspended, substantially as herein shown and described.

83,352.—HYDROCARBON BURNER.—H. W. Yerington, Jersey City, N. J

I claim, 1st, The combination, with the oil tank, A, of the air jacket, B, having inlet and outlets, d and e, for operation in connection with the burners of a liquid fuel apparatus, substantially as specified.

2d, The combination of the oil tank, A, air jacket, B, suction pipe, C, and steam jet pipe or nozzle, g, essentially as herein set forth.

3d, The combination of the pipe or pipes, I, mixing and distributing boxes, F, air pipes, C and G, and burners, E, for operation together, as specified.

4th, The intermediate connecting pipe, J, in combination with the gas pipes I, and air pipe, C, substantially as shown and described.

5th, The tubular burners, E E, arranged essentially as specified, and provided with oblique jet orifices or slots, e, as herein set forth.

83,353.—ATTACHMENT TO SPOOLS FOR CUTTING THREAD.—J. W. Murrell, Seaford, Del., assignor to himself, Samuel Perry, and E. R. Jacobs.

I claim, as an article of manufacture, the within described thread breaker, formed from sheet metal, its retaining parts, a a, being cut from its center, and bent at right angles thereto, substantially as and for the purposes herein set forth.

83,354.—BOBBIN AND THREAD-HOLDER FOR SPINNING MACHINES.—T. L. Luders, Olney, Ill.

I claim the coiled wire holder, A, having outwardly curved arms, a a, constructed as described, combined with the spindle and the bobbin, and serving as a holder for the bobbin and for the thread, as set forth.

REISSUES.

53,291.—CAR COUPLING.—J. J. Gest, Cincinnati, Ohio Dated March 20, 1866; reissue 3, 161.

I claim, in combination with arched or elliptic springs, having reversed curves at or near their ends, a correspondingly curved or inclined block abutment or bearing, so that, as the spring settles or yields under its load it will practically become shorter and stronger, but still retain its elastic quality, and be firmly held in place and to the block or bearing, substantially as herein described and represented.

74,919.—WASHING MACHINE.—Alford Lamb, Mary E. Lyman, and W. H Morse, Jeffersonville, N. Y, assignees of Alford Lamb. Dated Feb. 25 1868; reissue 3,162.

I claim, 1st, The combination of the base, B, supported by springs, and a strip or strips of rubber, C, arranged as described

2d, The combination of the above with the fluted roller, D, substantially as described.

15 334.—HARVESTER CUTTER.—J. G. Perry, Kingston, R. I., assignee, by mesne assignments, of C. W. Glover, Roxbury, Conn. Dated July 15, 1856; reissue 3,163.

I claim, 1st, The combination, with the guard fingers, of the oscillating or rocking ledger blades or cutters, constructed with recesses in their upper sides, substantially as and for the purpose specified.

2d, So arranging the ledger blades or cutters, constructed as described, within the guard fingers, that they may have a rocking or oscillating movement during the reciprocating movement of the sickle, substantially as herein set forth.

3d, The attachment of the ledger blades to the guard fingers by means of the trunnions, e, on the blades extending into the cavities, i, in the fingers, substantially as and for the purpose specified.

21,034.—SEED PLANTER.—J. H. Thomas & P. P. Mast, Springfield, Ohio. Dated July 27, 1858; reissue 3,164.

We claim, 1st, The arms, G3, mounted upon the shaft, G2, within the hopper G, substantially as and for the purpose described.

2, The slide, G1, having the openings, b, with the blocks or stops, c, fitting therein, and arranged to operate as described.

3d, The combination of the slide, G1, and blocks or stops, c, with the revolving arms, G3, all arranged to operate as herein set forth.

75,810.—RING FOR RING AND TRAVELER SPINNING MACHINE.—J. W. Wattles, Canton, Mass. Dated March 17, 1868; reissue 3,165.

I claim the ring receiver, constructed substantially as described, that is to say, not only with a shank to fit the rail socket, and with a bore eccentric with the cylindrical outer surface of such shank, as described, but also so as to be capable of being sprung or contracted upon the shank of the ring, by the screw inserted in the rail, and employed to confine the receiver in the socket of the rail, as set forth.

Also, the combination and arrangement of the single screw with the ring rail, and with the clamping receiver and ring, constructed as hereinbefore described, the whole being for the purpose set forth.

74,871.—COSMETIC.—J. M. Wilson, Seguin, Texas. Dated Feb. 25, 1868; reissue 3,166.

I claim, 1st, The chlorinated alkalies, or the alkaline chlorides, used as a cosmetical agent, in manner and for the purposes substantially as set forth.

2d, The chlorinated alkalies, or the alkaline chlorides, in combination with any acidulous wash.

3d, The chlorinated alkalies, or alkaline chlorides, in combination with an acidulous wash, made from either oxalic, tartaric, or citric acid, either separate or combined, substantially as described.

74,169.—BALLASTING VESSELS.—J. B. Stoner, Leopold Mendelson, and Theodore Crommelin, New York city, assignees of J. B. Stoner. Dated Feb. 4, 1868; reissue 3,167.

We claim, 1st, A ballasting weight, L, applied on the free end of a swinging arm in combination with a recess made in the hull of a vessel, to receive said weight and arm, and a tube, P, substantially as described.

2d, The use of one or more weights, secured to stiff rods, and applied to a vessel in such manner that they can be lowered considerably below a vessel's keel, or raised and secured within recesses formed in the bottom of a vessel, substantially as described.

3d, A temporary ballast, consisting of a weight secured to the lower ends of one or more rods, and adapted to fit into a socket formed in the vessel, and operated from the deck, said rods being suitably inclosed within a tube rising from said sockets, substantially as specified.

DESIGN.

3,212.—CLOCK CASE.—Karl Muller (assignor to Nicholas Muller), New York city.

Inventions Patented in England by Americans.

[Compiled from the "Journal of the Commissioners of Patents."]

PROVISIONAL PROTECTION FOR SIX MONTHS.

2,680.—APPARATUS FOR EFFECTING AERIAL PROPULSION.—John Hunter, Morristown, N. J. Aug. 26, 1868.

2,692.—PROJECTILES FOR ORDNANCE AND FIRE-ARMS.—W. H. Shock, Washington, D. C. Aug. 31, 1868.

2,694.—CUTTING NIPPERS.—Nathan Thompson, Brooklyn, N.Y. Aug. 31, 1868.

2,704.—LOOM.—George Crompton, Worcester, Mass. Sept. 1, 1868.

2,758.—ROTARY ENGINE.—George Whitcher, Brooklyn, N.Y. Sept. 7, 1868.

2,774.—STEAM BOILER.—Joseph Nason, New York city. Sept. 9, 1868.

2,780.—PUMP.—James Wilson, Bridgeport, Conn., and Chas. F. Mudge, Lynn, Mass. Sept. 9, 1868.

2,818.—SUBSTITUTE FOR HAIR STUFFING, FROM VEGETABLE FIBERS.—Nathan W. Blanchard, Dutch Flat, Cal. Sept. 14, 1868.

RECEIPTS.—When money is paid at the office for subscriptions, a receipt for it will be given, but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona-fide* acknowledgment of their funds.

CITY SUBSCRIBERS.—The SCIENTIFIC AMERICAN will be delivered in every part of the city at $4 a year. Single copies for sale at all the News Stands in this city, Brooklyn, Jersey City, and Williamsburg, and by most of the News Dealers in the United States.

Advertisements.

The value of the SCIENTIFIC AMERICAN *as an advertising medium cannot be over-estimated. Its circulation is ten times greater than that of any similar journal now published. It goes into all the States and Territories, and is read in all the principal libraries and reading rooms of the world. We invite the attention of those who wish to make their business known to the annexed rates. A business man wants something more than to see his advertisement in a printed newspaper. He wants circulation. If it is worth 25 cents per line to advertise in a paper of three thousand circulation, it is worth $2.50 per line to advertise in one of thirty thousand.*

RATES OF ADVERTISING.

Back Page.....$1.00 *a line.*
Inside Page.....75 *cents a line.*

Engravings may head advertisements at the same rate per line, by measurement, as the letter press.

PLANE MAKER WANTED.—
First-Class Molding Plane Maker Wanted. Address, stating terms, Box 4060 Boston, Mass.

THE American Bed Maker—Sells Rapidly.
Agents Wanted. Illustrated circulars free.
19 2 J. H. MARTIN, Hartford, New York.

STOCKS, DIES AND SCREW PLATES,
Horton's and other Chucks JOHN ASHCROFT, 50 John st., New York. 16 13

MACHINISTS' Tools, Wood-turning lathes, Chucks, etc., improved patterns. Inclose stamp for illustrated circulars. L. D. FAY, Worcester, Mass.
19 eow tf

ENGINE LATHES—The Thomas Patent, for sale at reduced prices. JAMES JENKS, Detroit, Mich., Greenlee Bros. & Co., Chas. H. Smith, Philadelphia, Thomas Iron Works, Worcester, Mass. 19 tf

ALCOTT LATHE—For Hoe, Broom, and Rake Handles, Chair Rounds, etc., with attachment for Nailed Spindles and Rolls for Bed-steads. Circulars sent. HENDERER BROS., Binghamton, N. Y.
19 1*

CAST STEEL WORKS
May obtain a Composition for making Crucibles, which bear six meltings of Cast Steel, from
ADOLF BESSELL,
1* in Dresden, Saxony.

PORTABLE AND STATIONARY Engines, built from new and improved patterns. Address Postoffice Box 5767.
HAMPSON & COPELAND,
19 1 Warerooms 89 Liberty st., New York.

CHROME ORE AND MANGANESE, ground fine, and suitable for use for hardening iron and other purposes, for sale in barrels, by
CHARLES L. OUDESLUYS,
No. 57 South Gay st., Baltimore, Md.

WOODWORTH IMPROVED PLANing and Matching Machines, and all other First-class Woodworking Machinery. Address Postoffice Box 5767.
HAMPSON & COPELAND,
19 4 Warerooms 89 Liberty st., New York.

THE SHAW & JUSTICE
HAMMER
Is the best one driven by a belt in the market. All sizes for all kinds of work. Send for circular
PHILIP S. JUSTICE,
19 4 42 Cliff st., N. Y., 14 North 5th st., Philadelphia.

WANTED—An Agent in each town to take the agency for the sale of Bradstreet's Rubber Molding and Weather Strips, applied to the sides, bottom, top, and center of doors and windows. The sale is beyond anything ever offered to an agent. From $10 to $25 per day can be made. Send for agent's circular. The first who apply secure a bargain.
19 3 J. R. BRADSTREET & CO., Boston, Mass.

ADAMS & ESALE'S PATENT GRAIN MOISTENER will moisten and toughen the bran of hard or frozen wheat, softening the berry, and improving the quality of the flour, and facilitating the process of bolting. A great saving in the work of preparing flour for the market. For territorial and manufacturing rights address ADAMS & ESALE,
Postoffice drawer, E. Avon, Fulton county, Ill.

THE NATIONAL CORN HUSKER having been thoroughly tested on the farm, is now offered to the public. It picks the ears from the stalks, and husks them perfectly without injury. By the hand machine 500 bushels per day can be easily husked; with one horse power, 600. Rights for sale. Machines will be furnished to purchasers of territory at cost. Office of the NATIONAL CORN HUSKER CO., No. 164 Duane st., New York. 19 2

$20 A DAY to MALE and FEMALE AGENTS—To introduce the BUCKEYE $20 SHUTTLE SEWING MACHINES. Stitch alike on both sides, and is the only Licensed Shuttle Machine in the market, sold for less than $40. All others are infringements, and the seller and user are liable to prosecution and imprisonment. Full particulars free. Address
W. A. HENDERSON & CO.,
19 4 Cleveland, Ohio.

A GOOD NUMBER!—The Best yet issued!—See Portraits and Biographies of Isabella, the late Queen of Spain, Max Muller, Isaac Taylor, Schiller, Chamisso, Gellert, Uhland, Heine, German Lyric Poets; Mrs. T. McGath, 107 years old; Gounod, the author of "Faust;" The Antiquity of Man; Shakespeare's play of Macbeth; Is Man Immortal? Getting Rich; Count Chorinski & the German Murderess, Baroness Ebergenyi, with suggestions on Culture and Crime; The Crisis in Life; Emerson on the Eye; Recreation vs. Stimulation; Tobacco and Boldheads; A good judge of Character; The New England Fisheries; May Twins Marry? etc. Only 30 cents, or $3 a year. Newsmen have it. Address
S. R. WELLS, Publisher, 389 Broadway, New York.
19 2

MODELS, PATTERNS, EXPERIMENTAL, and other Machinery, Models for the Patent Office, built to order by HOLSKE MACHINE CO., Nos 528, 530, and 532 Water street, near Jefferson. Refer to SCIENTIFIC AMERICAN office. 14 tf

Sault's Patent

FRICTIONLESS Locomotive Valves, easily applied; requires no changes.
12 13*tf M. & T. SAULT COMPANY, New Haven, Conn

RICHARDSON, MERIAM & CO.,
Manufacturers of the latest improved Patent Daniels' and Woodworth Planing Machines, Matching, Sash and Molding, Tenoning, Mortising, Boring, Shaping, Vertical and Circular Re-sawing Machines, Saw Mills, Saw Arbors, Scroll Saws, Railway, Cut-off, and Rip Saw Machines, Spoke and Wood Turning Lathes, and various other kinds of Wood-worsing machinery. Catalogues and price lists sent on application. Manufactory, Worcester, Mass Warehouse, 107 Liberty st., New York.
19 tf

AZURENE
CONCENTRATED INDIGO
For the Laundry.—Free from Oxalic Acid.—See Chemist's Certificate.
A Patent Pocket Pincushon or Emery Bag
IN EACH TWENTY CENT BOX.
For Sale by all respectable Grocers and Druggists.
14 13*

STEAM HAMMERS, TURN-TABLES, and Foundery Cranes. Address
14 tf GREENLEAF & CO., Indianapolis, Ind.

FOR LIGHT GRAY IRON CASTINGS, either Plain or Fancy. Finishing and Japanning of same. Also, Patterns of Wood or Metal Address
18 4 BRISTOL FOUNDERY CO., Bristol, Conn.

TO SOAP MANUFACTURERS.—Prof. H Dussauce, Chemist, is ready to furnish the most recent European processes to manufacture soaps and lyes of every description. Address New Lebanon, N. Y.
18 2*

Getty's Pat. Pipe Cutter

THIS Cutter works easy, rolls down the burr edge, and is confidently recommended to Gas and Steam Fitters as the best in the market.
No 1 cuts from 1-in. to ¾-in. Price.....$ 8.
No. 2 " 2-in. to ¼ in. Price.....$10.
GETTY'S PATENT PROVING PUMP & GAGE. This new Pump and Gage has been thoroughly tested, and gives general satisfaction. There is no glass or mercury used, and the Gage is so compact it can be carried in the pocket.
Pump and Gage.....$25. Gage alone.....$13.
Address McNAB & HARLIN,
Manufacturers of Brass Goods and Iron Fittings, 86 John st., New York. 18 12

SHINGLE & HEADING MACHINE,—Law's Patent. The simplest and best in use. Shingle Heading, and Stave Jointers. Stave Cutters, Equalizers, Heading Turners, Planers, etc. Address
17 tf TREVOR & CO Lockport, N. Y.

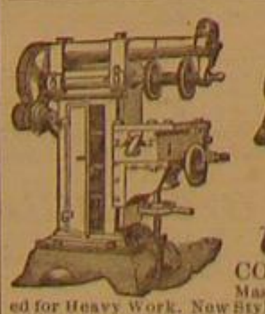
Organ Blowing

BY WATER POWER. For Engraving and Description of Apparatus invented M. Stannard, for the above use, address
PRATT, WHITNEY & CO.,
Hartford, Conn., Manufacturers of First-class Machinists' Tools, Gun Machinery, Hydraulic Engines, and Special Machinery. 18 3

You Want Martha!

THE Most Valuable, Hardy Wine Grape yet known. A seedling from the Concord, and as perfectly hardy, healthy and vigorous as that variety, and ripens 10 days earlier. Quality best, both for table and wine. A splendid Grape in all respects. Send stamps for illustrated Catalogues of over 50 varieties Grapes and small fruits, to GEO. W. CAMPBELL, Delaware, Ohio.

WHEELER & WILSON
625 BROADWAY,
NEW YORK.
BUTTON-HOLE
MAK ING
ATTACHMENT
1,000 BUTTON-HOLES A DAY
FOR
FAMILIES
AND
MANUFACTURERS.
18 2



Union Vise
CO., 61 Water st., Boston, Mass. Heavy and Pipe, warranted for Heavy Work. New Style Wood and Covered Screw. Milling Machines, simple, great capacity, two sizes. 2,000 and 950 lbs. G. H. NOTT, President.
A. H. BRAINARD, Superintendent. 16 13* tf

LATHE CHUCKS—HORTON'S PATENT—from 4 to 36 inches Also for car wheels Address E. HORTON & SON, Windsor Locks, Conn.
19 tf

POWER LOOMS. Improved Drop Box, Spooling, Winding, Reaming, Dyeing and Sizing Machines, Self-Acting Wool Scouring Machines, Hydra Extractors. Also, Shafting, Pulleys, and Self Oiling Adjustable Hangers, manuf'd by THOS WOOD, 210 Wood st., Phil'a, Pa.
9 13

PORTABLE STEAM ENGINES, COMbining the maximum of efficiency, durability, and economy with the minimum of weight and price. They are widely and favorably known, more than 600 being in use. All warranted satisfactory or no sale. Descriptive circulars sent on application. Address
J. C. HOADLEY & CO. Lawrence, Mass. 1 tf

WINCHESTER
Repeating Rifles,
FIRING TWO SHOTS A SECOND,
AS A REPEATER, AND
TWENTY SHOTS A MINUTE
AS A SINGLE BREECH-LOADER.

These powerful, accurate, and wonderfully effective weapons, carrying eighteen charges, which can be fired in nine seconds, are now ready for the market, and are for sale by all responsible Gun Dealers throughout the country. For full information send for circular and pamphlets to the WINCHESTER REPEATING ARMS CO.,
13 13 New Haven, Conn.

TUBE WELLS.—
The Champion Well of The World.—Horner's Patent. Orders received from England and South America. State, County, and Township Rights sold. Warranted to operate where others fail. Address.
13 13* W. T. HORNER, Buffalo, N. Y.

HUTCHINSON & LAURENCE,
8 Dey st., Dealers in every description of Iron and Woodworking Machinery. 18 4

PAGE'S GREAT WATER FLAME Coal, Patented Lime Kiln will burn No. 1 finishing lime with any coal or wood, mixed or separate, in same kiln. Rights for sale by C. D. PAGE, Rochester, N. Y.
24 26*

"BENEDICT'S TIME," for this Month.
Timetables of all Railroad and Steamboat lines from New York, with City Map, 25c., sent by mail.
BENEDICT BROS., Jewelers, 171 Broadway.
BENEDICT BROS., up town, 691 Broadway.
BENEDICT BROS., Brooklyn, 234 Fulton st 1 tf

BEACH'S PATENT SCREW CUTTING AND LATHE TOOL.—The best and only practical tool in the country. For sale by A. J. WILKINSON & CO.,
15 4eow No. 2 Washington st., Boston, Mass.

Brick Machine.

LAFLER'S NEW IRON CLAD has more advantages combined in one machine than any other ever invented. It makes common brick of very superior quality. By a slight change, press brick are made without repressing. With Lafler's Patent Mold, beautiful stock brick are made. This machine was awarded first premium at the N. Y. State Fair, 1867, for making Front Bricks. Examining Committee awarded special report, indorsing this machine. For descriptive circular address
J. A. LAFLER & CO.,
15 tf eow Albion, Orleans county, N. Y.

Charles W. Copeland,

CONSULTING & SUPERINTENDING Mechanical Engineer, No. 171 Broadway.—Giffard's Injectors, Steam and Vacuum Gauges, Blast Pressure Gauges, Salinometers, Damper Regulators, Water Gages, Hydraulic Jacks, Dimpfel's Patent Fan Blower. Roebling's Wire Rope for sale. 15 eow

PLATINUM. H. M Raynor, 748 Broadway, N. Y.
13 6*eow

AMERICAN TINNED
SHEET IRON.
Coating uniform over the entire sheet, by an entirely new and patented process. All sizes and gages on hand and made to order.
H. W. BUTTERWORTH
9 eow tf 29 and 31 Haydock st., Philadelphia, Pa.

MERRICK & SONS, Southwark Foundery,

430 Washington Ave., Philadelphia, Pa.,
MANUFACTURE NASMYTH & DAVY STEAM HAMMERS.
CORNISH PUMPING, BLAST, HORIZONTAL, VERTICAL, AND OSCILLATING ENGINES.
Gas Machinery of all descriptions.
Sugar Refineries, fitted up complete, with all modern apparatus.
New York office
62 Broadway.
11 eowtf

FOR BRASS LATHES and all Machinery connected with Brass Finishing and Fitting Line. Improved Lathes for making large valves etc. Address Exeter Machine Works, Exeter, N. H. 17 eowtf

SUB-MARINE ARMOR.
ANDREW J. SOWLE & SON,
11 9 eow* 40 Congress st., Boston, Mass.

17 eow

WOOD-WORKING MACHINERY, The SUBSCRIBER is the New York Agent for all the manufacturers, and sells at their prices. S. C. HILLS, 12 Platt st. 1 tfe

Priest's Ready Solder.

The only Patent Issued. All persons are cautioned against infringements. Samples sent on receipt of 25 cents. For sale everywhere. Agents wanted. Sole proprietors, W. W. BEAUCHAMP & CO., No. 49 Hanover st., Boston Mass. 11 tf

Bridesburg Manf'g Co.,

Office No. 65 North Front Street,
PHILADELPHIA, Pa.,
Manufacture all kinds of Cotton and Woolen Machinery including their new
Self-Acting Mules and Looms,
Of the most approved style. Plan drawn and estimates furnished for factories of any size. Shafting and mill gearing made to order. 9 tf 13*

OIL! OIL!! OIL!!!
FIRST PREMIUM.....PARIS, 1867
Grand Silver Medal and Diploma!
WORLD'S FAIR—London, 1862.
TWO PRIZE MEDALS AWARDED
PEASE'S IMPROVED OILS!
Engine, Signal, Lard, and Premium Petroleum is the Best Made for
Railroads, Steamers, and for Machinery and Burning.
F. S. PEASE, Oil Manufacturer,
Nos. 61 and 63 Main street, Buffalo, N. Y.
N. B.—Reliable orders filled for any part of the world. 1 tf

STEAM AND WATER GAGES, STEAM Whistles, Gage Cocks, and Engineer's Supplies.
16 13 JOHN ASHCROFT, 50 John st., New York.

U. S. PATENT OFFICE,
WASHINGTON, D. C., Oct. 16, 1868.
Jotham S. Conant, Hackensack, N. J., having petitioned for an extension of the patent granted him on the 16th day of January, 1855, for an improvement in "Sewing Machines" it is ordered that the said petition be heard at this office on the 28th day of December next.
Any person may oppose this extension. Objections, depositions, and other papers should be filed in this office twenty days before the day of hearing.
19 3 ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE,
Washington, D. C., Oct. 22d, 1868.
Thaddeus Selleck, of Greenwich, Conn., having petitioned for the extension of the patent granted him on the 30th day of January, 1855, for an improvement in "Method of Working Franklinite Ore," it is ordered that said petition be heard at this office on the 11th day of January, next
Any person may oppose this extension. Objections, depositions, and other papers should be filed in this office twenty days before the day of hearing.
ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE,
WASHINGTON, D. C., Oct. 21, 1868.
Geoge A. Brown, of Middletown, R. I., having petitioned for an extension of the patent granted him on the 23d day of January, 1855, for an improvement in "Hay Making Machine," it is ordered that the said petition be heard at this office on the 4th day of January next.
Any person may oppose this extension. Objections, depositions, and other papers should be filed in this office twenty days before the day of hearing.
ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE,
Washington, D. C., Oct. 19, 1868.
Charles Mettam, of New York city, having petitioned for an extension of a patent granted him on the 31 day of January, 1855, for an improvement in "Rolling Iron Shutters," it is ordered that said petition be heard at this office on the 4th day of January next.
Any person may oppose this extension. Objections, depositions, and other papers should be filed in this office twenty days before the day of hearing
ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE,
WASHINGTON, D. C., Oct. 15, 1868.
Russell Jennings, of Deep River, Conn., having petitioned for an extension of the patent granted him on the 30th day of January, 1855, reissued on the 3d day of Oct., 1865, and again reissued on the 16th day of January 1866, for an improvement in "Augers," it is ordered that said petition be heard at this office on the 11th day of January next.
Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.
ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE,
Washington, D. C., Oct. 7 1868.
Fanny Holmes, of Whitehall, N. Y., executrix of the estate of John E. Newcomb, deceased, having petitioned for the extension of a patent granted the said John E. Newcomb on the 9th day of January, 1855, for an improvement in "Grain Harvesters," it is ordered that said petition be heard at this office on the 14th day of December next.
Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.
18 3 S. H. HODGES, Acting Commissioner of Patents.

U. S. PATENT OFFICE,
Washington, D. C., Oct 3, 1868
Lysander Wright, of Newark, N. J., having petitioned for the extension of a patent granted him on the 2d day of January 1855, for an improvement in "Sawing Machine," it is ordered that said petition be heard at this office on the 14th day of December next.
Any person may oppose this extension. Objections, depositions, and other papers should be filed in this office twenty days before the day of hearing.
17 3 S. H. HODGES, Acting Commissioner of Patents.

R. A. BELDEN & CO.,
Manufacturers of Machinists' Tools, Iron Planers of improved patterns and designs, Crank Planers and Shaping Machines, Engine Lathes, Screw Machines, Milling Machines, and Gun Machinery. Also, Special Machinery, improved Nut and Bolt Machinery, Trip Hammers Model's, Dies, etc., etc
18 3 1os 2ts 268 Orange st., New Haven, Conn.

WOODWORTH PLANERS A SPECIALTY—From new patterns of the most approved style and workmanship Wood-working Machinery generally. Nos. 24 and 26 Central, corner Union street, Worcester, Mass.
16 tf WITHERBY RUGG & RICHARDSON.

A BOOK THAT EVERYBODY SHOULD HAVE.

WELLS' EVERY MAN HIS OWN LAWYER AND BUSINESS FORM BOOK,
Is a Complete and Reliable Guide in all matters of Law and Business Transactions for EVERY STATE IN THE UNION.
THE ENTIRE LEADING PRESS OF THE COUNTRY unqualifedly endorse the work. We make a few short extracts from the press:
"As a legal adviser always at hand to instruct the reader how to proceed in suits and business transactions of every and all kinds; as a form book to enable the least learned to draw up deeds, mortgages, agreements leases, orders, wills, etc; as a guide with regard to the laws of the various States concerning exemptions, liens, limitation of actions, collection of debts, usury, and so on, this volume is certainly invaluable to men of business, and it is not surprising that a hundred thousand copies have so soon found their way into the homes and country houses of the multitude. In addition, the work contains a full digest of the action of the Government relative to reconstruction and the freedmen, the General Bankrupt Law, the Patent Laws, Pension Laws, the Homestead Laws, the Internal Revenue Laws, etc. The publisher has determined to make this work complete, and, to our thinking he has succeeded. No business man or woman can with safety be without it."—New York Times.
"This work is one of the most valuable issues of the press of this country. It contains so much that every man in business should know, but which none have the time to acquire from voluminous works, that it is truly indispensable."—New York Dispatch.
"Such a useful book can not be too highly commended A more comprehensive digest could not be desired."—New York Weekly Tribune.
"There should be a copy of it in every family."—New York Weekly
"The most implicit confidence can be placed upon the work as authority on all the subjects of which it treats."—Philadelphia Age.
"You can purchase in this book what may be worth hundreds of dollars to you."—St. Louis Dispatch.
"It contains just the kind of information every business man stands most in need of."—Sunday Mercury.
"Every man no matter what his business may be, should have a copy."—Pittsburgh Dispatch.
"There is no better book or reference."—Phrenological Journal.
"The book is prepared to meet all the ordinary contingencies of business life, and it meets them clearly distinctly and well."—Round Table.
"It contains a vast amount of just such matter as every one ought to be acquainted with in the prosecution of all ordinary business."—N. Y. Christian Advocate.
"It is the best business guide ever published."—De Bow Journal, St. Louis.
"Every one should have a copy."—N. Y. Eve. Post.
"It is invaluable."—Cincinnati Enquirer.
"Indispensable to every household."—Cincinnati Commercial.
"This work is worthy of the popularity it has acquired as a convenient and reliable manual."—N. Y. Herald.
The work is published 12 no. size, 650 pages. Price in full leather binding $2 50, in half library $2 00. Sent postpaid on receipt of price.
Agents wanted everywhere.—Address
B. W HITCHCOCK, Publisher
98 Spring street, N. Y.

AMESSIEURS LES INVENTEURS—A cet important avis. Les inventeurs non familiers avec la langue Anglaise, et qui préféreraient nous communiquer dans leur langue natale. Envoyez nous un dessin et une description concise pour notre examen. Toutes communications seront reçus en confidence.
MUNN & CO.,
Scientific American Office No. 37 Park Row New

PATENT CLAIMS.—Persons desiring the claim of any invention, patented within thirty years, can obtain a copy by addressing a note to this office, giving name of patentee and date of patent, when known, and inclosing $1 as a fee for copying. We can also furnish a sketch of any patented machine to accompany the claim, at a reasonable additional cost. Address MUNN & CO. Patent Solicitors, No. 37 Park Row New York.

Advertisements.

Advertisements will be admitted on this page at the rate of $1 per line. Engravings may head advertisements at the same rate per line, by measurement, as the letter press.

PATTERN LETTERS to put on Patterns for Castings, etc. KNIGHT BROS., Seneca Falls, N.Y. 1 50*

FOR FIRST-CLASS MACHINERY FOR the Manufacturing of Spokes, Hubs, etc., address the manufacturer, J. GLEASON, 1600 Germantown avenue, Philadelphia, Pa., U. S. A. 19 12os

FOR SALE—Machinery, Tools, Patterns, and Patents, for the Manufacture of Cistern, Deep Well, and Mining Double and Single-action lift and Force Pumps; or would take an interest with a party of means Apply to T. IBBOTSON, 61 Ann st., New York. 19 1*os

London.....48 Cannon street.
H. KOHNSTAMM,
Manufacturer of
ULTRAMARINE,
And importer of English, French, and German Colors, Paints, and Artists' Materials, Bronzes and Metals, No. 3 Tryon Row, New York, opposite City Hall. 19 13os

AMES IRON WORKS, Oswego, N. Y., For Sale or to Rent. The long-continued illhealth of the proprietor makes mental relaxation necessary. These works employ about One Hundred men, are eligibly situated, and have a good business established, and to a man of some means and good ability this is a rare chance. Terms easy. H. M. AMES. 17 4os*

THE MAGIC COMB
Will color the Hair or Beard a permanent Black or Brown It contains no poison. There is no slop or stain arising from its use. If you buy one you will forever discard all other hair dyes or preparations. One Comb will be forwarded to any person on receipt of $1 25. Price lists furnished to dealers only, on application. Address W. PATTON, Treasurer Magic Comb Co., 19 4os Springfield, Mass. For sale everywhere.

HOW TO OBTAIN
A Genuine
WALTHAM WATCH
AT THE LOWEST PRICE
And Without any Risk Whatever.

FIRST—Send for our descriptive Price List, which explains all the different kinds, tells the weight and quality of the cases, and gives prices of each.

NEXT—Make a selection and send us your order, being sure to give name and address in full.

We will then send the Watch by Express, with bill to collect on delivery, and instruct the Express Company to allow you to open the package and examine the Watch and if satisfactory you can pay for it and take it. If not, it can be returned at our expense; and should the Watch be taken and afterward not perform well, we will exchange it, or refund the money.

LOOK AT THE PRICES!

Silver Hunting Watches	$18
Gold Hunting Watches, 18 Karat Cases	80
Gold Hunting Watches, Ladies' size	70

Every Watch is Warranted by Special Certificate from the American Watch Company.

SPECIAL NOTICE.

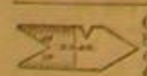
☞ Several valuable improvements have been made in all the Watches manufactured at Waltham, since the first of September, and purchasers will do well to select those made since that time, the full particulars of which will be found in our Price List.

Please state that you saw this in the SCIENTIFIC AMERICAN. Address, in full,

HOWARD & CO.,
Silversmiths and Jewelers,
19 2os eow No. 619 Broadway, N. Y.

BODINE'S JONVAL TURBINE WATER Wheel, combining great economy in the use of water, simplicity, durability, and general adaptation to all positions in which water can be used as a motive power. We are prepared to furnish & warrant the same to give more power than any overshot or other turbine wheel made using the same amount of water. Agents wanted. Send for descriptive circular. BODINE & CO., Manuf's, Mount Morris, N. York, and Westfield, Mass.

3 os tf eow



Center Gage and Gage or Grinding and Setting Screw-thread Tools. Sent per mail on receipt of 50c., by DARLING, BROWN & SHARPE, Providence, R.I. 15 3eowos*

REVOLVING HEAD-SCREW MACHINE.

This Machine is suitable for making, from bar iron, all kinds of screws and studs ordinarily used in a machine shop. One man, with this machine, will produce as many screws as from three to five men can make on as many engine lathes, and they will be more uniform in size. Nuts can be drilled, tapped, and the sides faced up, and many parts of sewing machines, cotton machinery, gas and steam fittings made on this machine, with a great saving of time and labor. Size of hole through spindle 1¼ inches.

BROWN & SHARPE MF'G Co., Providence, R. I. 15 3eowos

WROUGHT-Iron Pipe for Steam, Gas and Water; Brass Globe Valves and Stop Cocks, Iron Fittings, etc. JOHN ASHCROFT, 50 John st., N. Y. 16 13

$2000 A Year and Expenses to Agents to introduce the Wilson Sewing Machine. Stitch alike on both sides. Sample on 2 weeks trial. Extra inducements to experienced agents. For further particulars, address the Wilson Sewing Machine Co., Cleveland, Ohio; Boston, Mass.; or St. Louis, Mo. 16 8 os

ROOT'S WROUGHT IRON SECTIONAL
SAFETY BOILER
Has no large sheet-iron shell to explode; is tested to 300 lbs.; economical and durable. Also ROOT'S Trunk Engines. Vertical and Horizontal Engines, all descriptions. Steam Pumps, Machinery, etc. Send for pamphlets and price lists. Agents wanted. JOHN B. ROOT, 11 13os Nos. 95 and 97 Liberty st., near Broadway.

FREE. Our New Catalogue of Improved STENCIL DIES. More than $200 A MONTH is being made with them S. M. SPENCER & CO., Brattleboro, Vt. 1 tf

CAP & Set Screws as perfect as Engine-cut Screws. Address S. C. SMITH, Lowell, Mass. 18 7os*

WIRE ROPE.
Manufactured by
JOHN A. ROEBLING
Trenton, N. J.

FOR Inclined Planes, Standing Ship Rigging, Bridges, Ferries, Stays or Guys on Derricks and Cranes, Tiller Ropes, Sash Cords of Copper and Iron, Lightning Conductors of Copper. Special attention given to hoisting rope of all kinds for Mines and Elevators. Apply for circular, giving price and other information. 14 os tf

CARVALHO'S
Steam Super Heater
SAVES Fuel, and furnishes Dry Steam, Invaluable to Manufacturers of Paper, Cotton, and Woolen Goods, Soap, Glue, Enameled Cloth, etc., in Dye and Print Works, or for Power. Address HENRY W. BULKLEY, Engineer, 70 Broadway, N. Y. 16 4os

CATALOGUES SENT FREE.
MATHEMATICAL INSTRUMENTS, 112 pages.
OPTICAL INSTRUMENTS, 72 pages.
MAGIC LANTERNS and STEREOPTICONS, 100 pp.
PHILOSOPHICAL INSTRUMENTS, 84 pages.
JAMES W. QUEEN & CO.,
16 4os* 924 Chestnut st., Philadelphia, Pa.

KIDDER'S PASTILLES—A Sure Relief for Asthma. STOWELL & CO., Charlestown, Mass. 15 6os*

BEFORE BUYING WATER WHEELS, See, or send for description of Pressure Turbine, made by PEEKSKILL MAN'F'G CO., Peekskill, N. Y. 11 13os*

Ready Roofing
THE FIRST CUSTOMER IN EACH place can buy 1000 feet for $30, about half price. Samples and circulars sent by mail. Ready Roofing Co., 81 Maiden Lane, New York. 12 tf os

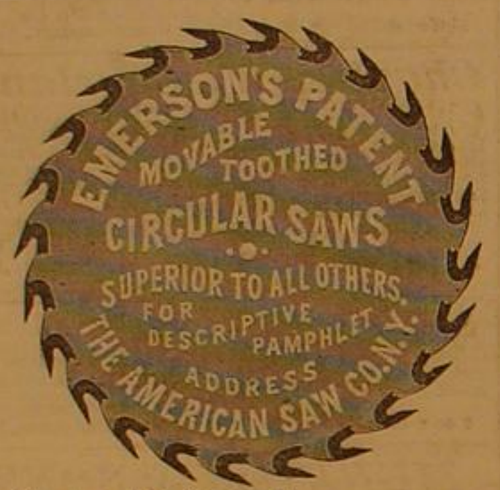
Pressure Blowers
OF ALL SIZES, for purposes where a blast is required. For particulars and circulars, address B. F. STURTEVANT, No. 72 Sudbury st., Boston, Mass. 16 tf os

THE INDICATOR APPLIED to Steam Engines. Instruments furnished and instruction given. F. W. BACON, 1 tf 84 John st., New York.

WOODWARD'S COUNTRY HOMES. 150 Designs, $1 50, postpaid, GEO. E. WOODWARD, Architect, 191 Broadway, N. Y. Send stamp for catalogue of all new books on Architecture. 9 ostf

DO YOU WANT GAS
WE can afford to pipe your house, or pay for your fixtures, or both and leave them as your property if we cannot put up a Machine that shall be perfectly satisfactory under any and every condition. Circulars and information. UNION GAS CO., 1 os tf 14 Dey st., New York.

TWIST DRILLS, FLUTED HAND REAMERS, exact to Whitworth's gage, and Beach's Patent Self Centering Chuck, manufactured by Morse Twist Drill and Machine Co., New Bedford Mass. 9 ostf



Factory, Trenton, N. J. . . . . Office, No. 2, Jacob st., N. Y.
Branch Office for Pacific coast, No. 606 Front street, San Francisco, Cal. 15 tf

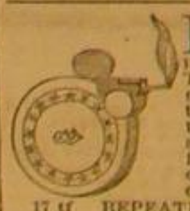
Reynolds'
TURBINE WATER WHEELS
And all kinds of MILL MACHINERY.
Send for New Illustrated Pamphlet for 1868.
GEORGE TALLCOT, 96 Liberty st., New York.
15 os 13*

EAGLE ANVILS, and PARALLEL CHAIN VISES.
Manufactured ONLY by
(15 26os*) FISHER & NORRIS, Trenton, N. J

WM. D. ANDREWS & BROTHER,
414 Water st., New York, Manufacture
Patent Smoke-burning & superheating Boilers that are safe. DRINAGE and WRECKING PUMPS, to pass large bodies of water, Sand, and Gravel. HOISTING MACHINES, Friction Grooved and Noiseless, or with Gearing. OSCILLATING ENGINES, from half to two hundred and fifty horse power. All of these Machines are Light, Compact, Durable, and Economical. 13 13os

NEW AND IMPROVED BOLT CUTTER—Schlenker's Patent.—The Best in use. Cutting Square, Coach Screw and V-Thread by once passing over the iron. Cutter Heads can be attached to other Machines, or the ordinary Lathe. Taps furnished to order. Circular price list, with references, mailed on application. 15 tf R. L. HOWARD, Buffalo, N. Y.

TALLOW LUBRICATORS and a General assortment of Brass Work, of superior quality at low prices, at Cincinnati Brass Works. 15 tf F. LUNKENHEIMER, Prop.



POCKET REPEATING LIGHT.—A neat little self-lighting pocket instrument, with improved Tape Matches, giving instantly a clear beautiful flame by simply turning a thumb piece, and can be lighted fifty times in succession without filling. A sample instrument, filled with the inflammable tape, with circular and list of prices, sent by mail on receipt of 65 cents. Address 17 tf REPEATING LIGHT CO., Springfield, Mass.

TODD & RAFFERTY, Manufacturers and DEALERS IN MACHINERY. Works, Paterson, N. J.; Warerooms, 4 Dey st., N.Y., Boilers, Steam Pumps, Machinists' Tools. Also, Flax, Hemp, Rope & Oakum Machinery; Snow's & Judson's Governor's; Wright's Patent Variable Cut-off and other Engines. tf 1

Sheet and Roll Brass,
BRASS AND COPPER WIRE, German Silver, etc.,
Manufactured by the
THOMAS MANUFACTURING CO.,
Thomaston, Conn.
☞ Special attention to particular sizes and widths for Type Founders, Machinists, etc. 23 26*

CHARLES A. SEELY, CONSULTING and Analytical Chemist, No. 26 Pine street, New York. Assays and Analyses of all kinds. Advice, instruction, Reports etc., on the useful arts. 11

PATENT
Steam Brick Dryer.
The subscriber, having obtained Letters Patent for an improved brick drying apparatus, and believe d to be the best and most economical dryer yet offered to the public, now offers for sale, upon favorable terms, State, County, and Single Rights. Apply to I. C. HATCH, Camden, N. J.

This is to certify that the Steam Brick Drying Kiln of Isaac C. Hatch is now in sucessful operation at our works, doing, in my opinion, all he claims for it. The bricks, afterbeing burnt, are strong and sound. A. REEVES, 36 4 "Pea Shore Steam Brick Works."

ALLEN PATENT ANTI-LAMINA Will Remove and Prevent Scale in Steam Boilers, now used in Tubular, Cylinder, and the Harrison Boilers. It has never failed. Price $5 per can. ALLEN & NEEDLES, 15 5* 41 South Water st., Philadelphia.

SECOND-HAND
Machinery and Boilers
FOR SALE.

One	25-H. P. Corliss Engine.
Three	30-H. P., Slide Valve, do.
One	100-H. P., Hewes & Phillips, do.
One	25-H. P. Locomotive Boiler.
Three	30-H. P. Tubular do.
Two	30-H. P. Fine do.
One	45-H. P. do. do.
One	60-H. P. Engine with Fine, Boilers, and Complete fixtures, at Milwaukee, Wisconsin.

All the above are in complete order, and will be sold very low for cash. Address WASHINGTON IRON WORKS, New Burgh, N. Y. New York city office 57 Liberty st. 17 4

BUERK'S WATCHMAN'S TIME DETECTOR.—Important for all large Corporations and Manufacturing concerns—capable of controlling with the utmost accuracy the motion of a watchman or patrolman, as the same reaches different stations or his beat. Send for a Circular. J. E. BUERK, P. O. Box 1,057, Boston, Mass.

N. B.—This detector is covered by two U. S. patents. Parties using or selling these instruments without authority from me will be dealt with according to law. 15 12*

FOR Twist Drills, Reamers, Chucks, and Dogs, address Am. Twist Drill Co., Woonsocket, R.I. 11 tf

Harrison's Grain Mills
WITH A VARIETY OF BOLTERS, Elevators, Smut Machines, and Corn Crackers For Sale. EDWARD HARRISON, New Haven, Conn. 15 tf

WOODBURY'S PATENT
Planing and Matching
and Molding Machines, Gray & Woods Planers, Self-oiling Saw Arbors, and other wood-working machinery. Send for Circulars 85 Liberty street, N. Y.; B. A. WOODS, 67 Sunbury street, Boston. 11 19*

R. BALL & CO., Worcester, Mass., Manufacturers of the latest improved patent Daniels', Woodworth's, and Gray & Wood's Planers, Sash Molding, Tenoning, Power and Foot Mortising, Upright and Vertical Shaping and Boring Machines, Scroll Saws, Double Saw Bench, Re-Sawing, and a variety of other machines for working wood. Also, the best Patent Hub and Rail-car Mortising Machines in the world. Send for our illustrated catalogue. 12 tf

SETS, VOLUMES AND NUMBERS. Entire sets, volumes and numbers of SCIENTIFIC AMERICAN (Old and New Series) can be supplied by addressing A. B. C., Box No. 773, care of MUNN & CO., New York.

The Harrison Boiler.
THIS IS THE ONLY REALLY SAFE BOILER in the market, and can now be furnished at a *GREATLY REDUCED COST*. Boilers of any size ready for delivery. For circulars, plans, etc., apply to HARRISON BOILER WORKS, Philadelphia, Pa.; J. B. Hyde, Agent, 119 Broadway New York; or, to John A. Coleman, Agent, 53 Kilby st., Boston, Mass. 6 tfos 13*

WHEATON'S OINTMENT cures the Itch
WHEATON'S OINTMENT will cure Salt Rheum.
WHEATON'S OINTMENT cures Old Sores.
WHEATON'S OINTMENT cures all diseases of the Skin.
Price 50 cents;—by mail 60 cents. All Druggists sell it.
WEEKS & POTTER, Boston, Proprietors. 1 19* os

IRON PLANERS, ENGINE LATHES, Drills, and other Machinists' Tools, of Superior Quality, on hand and finishing. For Sale Low. For Description and Price, address NEW HAVEN MANUFACTURING CO., New Haven. 15 tf os

SILICATE OF SODA AND POTASH, for Sweetening hard water in cisterns and wells; also for protecting wood and making cements water and fire-proof. For sale by the sole manufacturers, L. & J. W. FEUCHTWANGER, 16 4* 55 Cedar st., New York.

NOTICE TO STEEL, GLASS, and Patent Dryer Manufacturers.—Peroxide of Manganese, over 80 per cent, and Tungsten or Wolfram ore, in crystals or powder, for sale by the importers, L. & J. W. FEUCHTWANGER, 16 4* 55 Cedar st., New York.

ASHCROFT'S LOW WATER DETECTOR will insure your Boiler against explosion. JOHN ASHCROFT, 50 John st., New York. 16 13

FOR STEAM ENGINES BOILERS, SAW Mills, Cotton Gins, address the ALBERTSON AND DOUGLASS MACHINE CO., New London, Conn. 1 tf

EMPLOYMENT.—$15 to $30 a day guaranteed. Male or Female Agents wanted in every town—descriptive circulars free. Address 15 13* JAMES C. RAND & CO., Biddeford, Me.

HOTCHKISS ATMOSPHERIC FORGE Hammer. Will forge a 3-inch bar. Fine Machine. For sale. EDWARD HARRISON, New Haven, Conn. 15 tf

ROBERT McCALVEY, Manufacturer of HOISTING MACHINES AND DUMB WAITERS. 15 13 602 Cherry st., Philadelphia, Pa.

B. E. LEHMAN, MANUFACTURER OF brass and iron body globe valves and cocks, gage cocks, oil cups, steam whistles. Special attention paid to heavy iron body valves for furnaces and rolling mills. Send for price list to B. E. LEHMAN, 12 9 Lehigh Valley Brass Works, Bethlehem, Pa.

Boiler for Sale.
A DINSMORE'S PATENT BOILER, of about 50-Horse Power, nearly New, and in perfect order, will be sold very low (if applied for at once), to give place to a larger one. Enquire of SEYMOUR, MORGAN & ALLEN, Brockport, N.Y., or WOODBURY, BOOTH & CO., Rochester, N. Y. 18 3

BOILER FELTING SAVES TWENTY-five per cent of Fuel. JOHN ASHCROFT, 16 13 50 John st., New York.

LARGE LOT OF TOOLS FOR SALE. COMPRISING all that are necessary for a heavy machine shop; second-hand, in good order, with shafting, etc. Also, several Milling, Slabbing, and Screw Machines, Vises, Drills, and small tools, new and in perfect order. Address HORACE McMURTRIE & CO., 17 3 80 Milk street, Boston, Mass.

Lucius W. Pond,
IRON and Wood-working Machinery, Machinists' Tools and supplies, Shafting, Mill Gearing, and Jobbing. Also, Sole Manufacturer of TAFT'S CELEBRATED PUNCHES & SHEARS, (Works at Worcester, Mass.) 98 Liberty st., New York. 14 tf

CAMDEN
Tool and Tube Works,
CAMDEN, N. J. Manufacturers of WROUGHT IRON Welded Tube for Steam, Gas, and Water, and all the most Improved Tools for Screwing, Cutting, and Fitting Tube by Hand or Steam Power. Sole Manufacturers of Peace's Patent Adjustable Pipe Tongs, Clean-cutting Pipe Cutter. Also, Gas-pipe Screwing Stocks, polished. No. 1 Stock Screws ¼, ⅜, ½, ¾ Tube, price complete, with dies, $10. No. 2, do., 1, 1¼, 1½, 2 do., do., $20. No. 3 do., both screws and cuts off, 2½, 3, 3½, 4, do., do., $65. 11 13*

$10 A Day for all. Stencil tool, samples free. Address A. J. FULLAM, Springfield, Vt. 7 13

1868.

SCIENTIFIC AMERICAN.

Established 1845.

The **SCIENTIFIC AMERICAN** is published every week, and is the largest and most widely circulated journal of its class now pulished in this country. Each number is illustrated with **Original Engravings**, representing New Inventions in Mechanics, Agriculture, Chemistry, Manufactures, Steam and Mechanical Engineering, Photography, Science, and Art; also Tools and Household Utensils. TWO VOLUMES with COPIOUS INDEXES, are published each year, commencing January 1st, and July 1st. **Terms**:—One Year, **$3**; Half-Year, **$1 50**; Clubs of Ten Copies for One Year, **$25**; Specimen Copies sent gratis. Address

MUNN & CO.,
37 Park Row, New York.

☞ The Publishers of the **Scientific American**, in connection with the publication of the paper, have acted as **Solicitors of Patents** for **twenty-two years. Thirty Thousand** Applications for Patents have been made through their Agency. More than **One Hundred Thousand Inventors** have sought the counsel of the Proprietors of the **SCIENTIFIC AMERICAN** concerning their inventions. Consultations and advice to inventors, by mail, free. Pamphlets concerning Patent Laws of all Countries, free.

☞ **A Handsome Bound Volume**, containing **150** Mechanical Engravings, and the United States Census by Counties, with Hints and Receipts for Mechanics, mailed on receipt of **25c.**

SCIENTIFIC AMERICAN

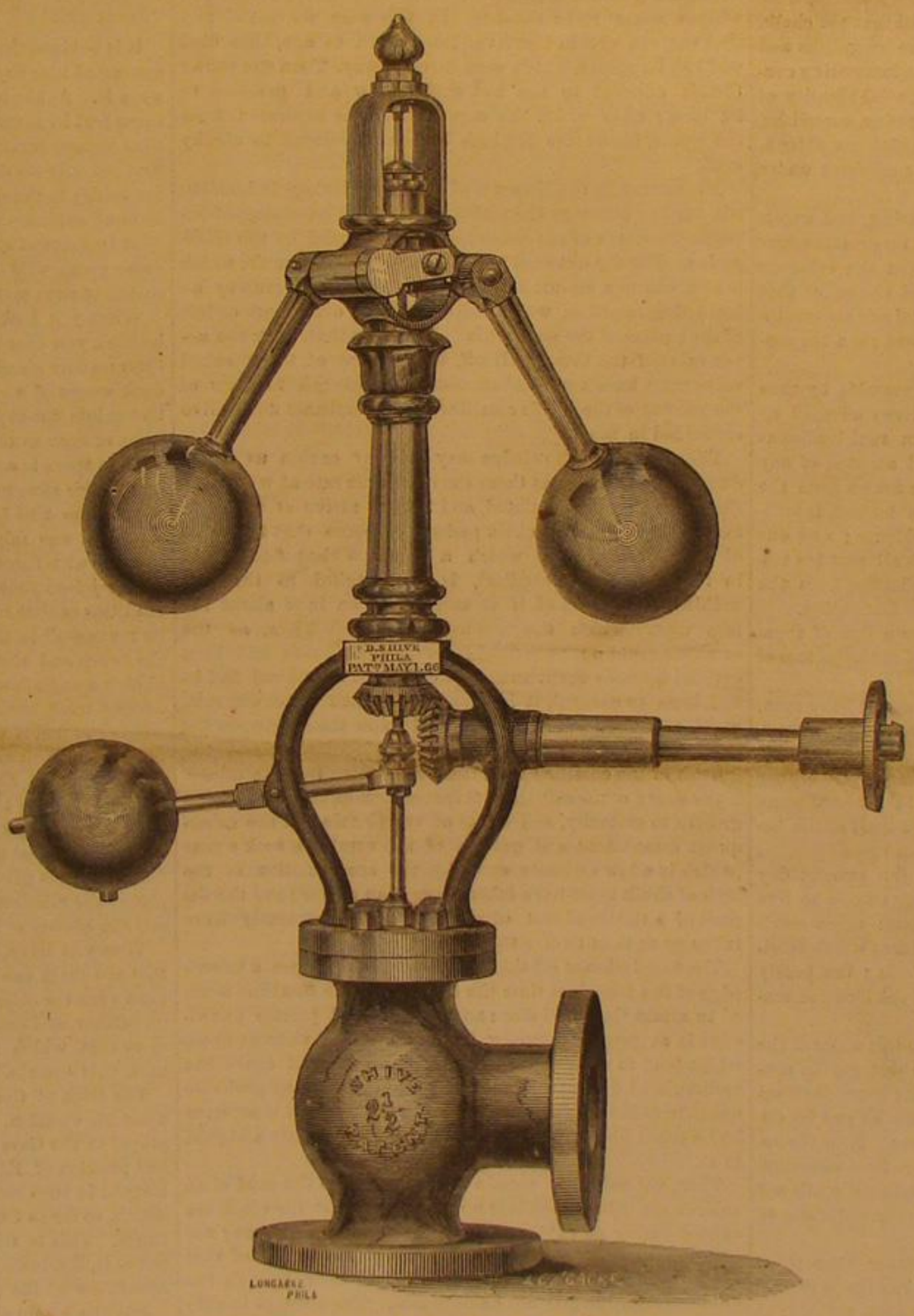
A WEEKLY JOURNAL OF PRACTICAL INFORMATION, ART, SCIENCE, MECHANICS, CHEMISTRY, AND MANUFACTURES

Vol. XIX.---No. 20. [NEW SERIES.] NEW YORK, NOVEMBER 11, 1868. $3 per Annum [IN ADVANCE.]

Patent Steam Engine Governor.

The nature of this improvement consists in swinging the balls of a centrifugal governor, at an angle to a radial line, harmonizing with and corresponding to the motion of said balls, in such manner that the inertia, the momentum and centrifugal force, all act in favor of the governor, instead of against it, as is the case in the ordinary centrifugal governor.

This is illustrated in Fig. 2. A circle, B, is struck, of nearly the size of the ball. A square is then formed by drawing lines tangentially with the circles as shown by dotted lines. This square gives the plan of the governor. C is the point of suspension of the arm; the line from C to D represents the arm, as also the direction of the swing of the ball. The lines from C to E constitute the centers of the pins upon which the arms, F, and links, G, are firmly fixed. The pins connecting, F and G, turn freely in sockets, C E. Links, G, form a connection with a stem passing through the center of the valve. Links, G, may also turn outward, as shown at H, and form a connection with a sliding sleeve. The sockets, C E, are firmly secured to the shaft giving them motion. The angle of the plane in which the balls swing is indicated by the dotted radial line, I. Balls vibrating at this angle will swing freely whether moving quickly or slowly; if moved slowly, they will be acted upon by but little centrifugal force, and will swing low and perfectly free from the point of suspensions; if moved quickly, they will be acted upon by greater centrifugal force, and will swing higher and further out, though quite freely, without causing the least binding or friction at the joints, by which the arms are suspended. The balls are at liberty to fall to the rear of the points of suspension, or to gain upon said points, according as the force of their inertia or their momentum predominates. By this arrangement we obtain a governor the most simple and cheap of construction, beautiful in form, and in action, durability, and efficiency the most complete.

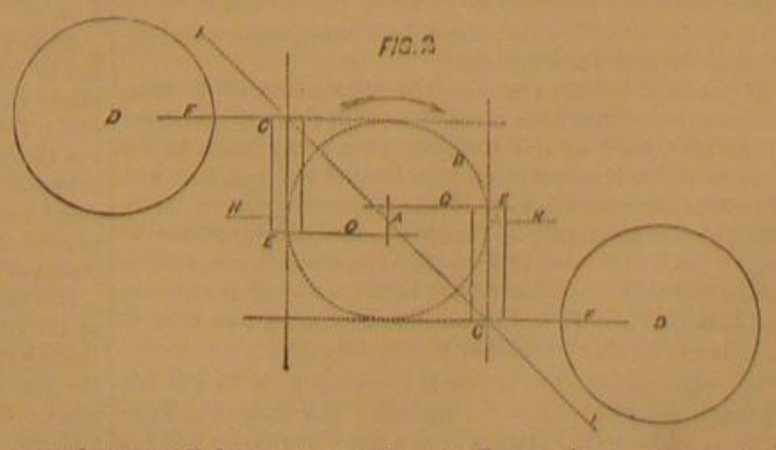


SHIVE'S STEAM ENGINE GOVERNOR.

THE VALVE.—Much difficulty is experienced from improperly constructed valves. Many valves being so constructed that large surfaces slide upon and against each other. The contact of these surfaces is expected to be steam tight, and yet freely move against each other. This is a mechanical impossibility; if such valve is anything like steam-tight, it will require a great force to move it; and should it gum or expand the least; it will stick so tight as to require a sledge to move it. If it is made to move freely, steam will pass between the surfaces, and in a short time cut a passage around the valve, instead of passing through it. Such valves should never be put on engines. The valve attached to this governor is so constructed that its opening and closing does not depend upon surfaces moving upon or against each other, but upon surfaces moving towards and from each other. The impact of the passing stream is not upon and over the surfaces that are depended upon for closing the valve, consequently the cutting of the valve by the steam will never cause it to leak. The valve has two steam passages perfectly balancing each other. The steam can never make for itself false passages, as there are no joint or openings but the proper passages for the steam.

GRADUATING VALVES.—An idea has been entertained that a valve should have an increased opening, tapering toward a point. Such valve will, as is intended, supply steam to the engine in a ratio differing from that of the action of the governor. To graduate the quantity of steam to the engine is especially the office of the governor, and any attempt to effect it in the valve acknowledges the deficiency of the governor. If the valve openings are proportioned to the supply pipe, a good governor will do all the graduating. The effect of a taper valve is but to lengthen the throw of the valve. This becomes necessary from the defects of the radial centrifugal governor, as it never acts at the proper time and always with a plunge beyond the proper point. For this reason the valve openings are made close, requiring a long throw, so that the defective governor will not at one moment cut all the steam off, and the next throw it all on. Hence a graduating valve.

THE GOVERNOR AS A CUT-OFF.—A good governor combined with a properly constructed valve constitutes perhaps the best variable cut-off made. The capacity of the valve should equal that of the pipe; the openings should be perfectly straight across, without the least taper. Such a valve will require but very little throw, and a governor acting positively and simultaneously with any change of speed in the engine will either cut off all the steam, when required, or give the boiler pressure of the steam from a change of speed impossible to be detected by the eye. With the usual variable



cut-off the steam may be cut off near the beginning of the stroke, and no steam can be admitted until the beginning of the next stroke. If a heavy load be thrown on the engine immediately after the steam is cut off near the beginning of the stroke, the speed of the engine will be dragged down before steam can be admitted after passing the center.

The manufacturers say: "By this arrangement we have the use of the steam at boiler pressure, when required, as also expansively. The steam is also admitted or cut off at any point where and when required.

"In offering this governor to the public we start out with the broad assertion that all ball governors heretofore have been constructed upon false principles—that it is false theory to swing a pendulum across the line of the power which imparts to it motion, and that a ball and arm made to vibrate in planes nearly horizontal are in a very bad position to act the part of a pendulum.

"We show by experiment that a governor so constructed that the pendulum swinging in harmony with the laws of mechanics, has a power over the best usual ball governor of like weight as ten to one, and action ten times greater. The wear and friction in the new, being perhaps one-tenth of that of the old. In mounting the old and the new upon the same shaft the defects of the old become so glaring by contrast as to excite surprise at the length of time they have been permitted to exist."

Patented May 1st, 1866. Manufactured by the Shive Governor Company, Northwest corner of Twelfth and Buttonwood Streets, Philadelphia, Pa.

Road Making by Steam.

The common practice of road making in this country, says the *Railway Times*, is one of waste and utter want of economy in every respect. The process is something like this: The upper soil is removed, and coarse gravel or broken stone supplied to bring up the grade, and the road is then left to be worn down smooth by passing teams and carriages. Think what a waste of power is thus involved, what an immense and useless wear of vehicles, what loss of time and what amount of general discomfort. Drainage is seldom thought of, and during the wet seasons, and especially when the frost is coming out of the ground, the roads are nearly impassable. The common remedy for all this is to pile on more gravel or broken stone, and then again commences the destruction of wheels. This useless tax to the owners of horses and vehicles could nearly all be prevented if the roads were properly made, drained and cared for. Proper drainage is the first essential; then the road dressed with gravel or stone should be formed and rolled into proper form to shed water—a very slight incline to either side is all that is necessary—and then you have a road that is easy to horses, and the load is carried with half the power that is expended in hauling over very many of the roads in our suburban towns. Less gravel or broken stone, but more care that it is kept in place and mooth, is what is required. In England and France they are using powerful steam rollers with beneficial results.

A London paper describes the process thus: "The road is first prepared by being loosened with pick-axes, then covered with the ordinary broken granite; above this a dressing of sand is laid; the whole is then watered. An immense roller is propelled by steam, and moved slowly over the prepared surface. It exerts a pressure of twenty-eight tuns, and the result is that in an unusually short time a firm and compact Macadamized road is formed so smoothly that the lightest vehicles may be immediately driven over it without fear of injuring the springs. The engine works almost without noise, and appears to consume nearly all its own smoke."

Daily care is required for a while, to prevent the forming of ruts; as soon as the ruts appear, they should be filled and then rolled over again. This costs something, but the eventual or resultant cost is less, both to the town authorities and those who use the roads, than is that of our present system. A smooth and even surface is nearly as important on common roads as it is on the railway. The science of road making is simple enough, but our people almost always fail in it. Once properly constructed and drained, our common roads could be kept in good working order for a tithe of what it now costs. The use of the steam roller simplifies the matter very much, and probably before long it will be freely used in nearly all our larger towns. One of these powerful steam

rollers has lately been constructed in England, to be used in the United States Arsenal grounds in Philadelphia, and on trial it is found to work admirably.

ON A "PIECE OF CHALK."—A LECTURE TO WORKING-MEN.

[Concluded from page 290.]

In working over the soundings collected by Captain Dayman, I was surprised to find that many of what I have called the "granules" of that mud were not, as one might have been tempted to think at first, the mere powder and waste of *Globigerinæ*, but that they had a definite form and size. I termed these bodies *coccoliths* and doubted their organic nature. Dr. Wallich verified my observation, and added the interesting discovery, that not unfrequently bodies similar to these "coccoliths" were aggregated together into spheroids, which he termed *coccospheres*. So far as we knew, these bodies, the nature of which is extremely puzzling and problematical, were peculiar to the Atlantic soundings.

But, a few years ago, Mr. Sorby, in making a careful examination of the chalk by means of thin sections and otherwise, observed, as Ehrenberg had done before him, that much of its granular basis possesses a definite form. Comparing these formed particles with those in the Atlantic soundings, he found the two to be identical; and thus proved that the chalk, like the soundings, contains these mysterious coccoliths and coccospheres. Here was a further and a most interesting confirmation, from internal evidence, of the essential identity of the chalk with modern deep-sea mud. *Globigerinæ*, coccoliths, and coccospheres are found as the chief constituents of both, and testify to the general similarity of the conditions under which both have been formed.

The evidence furnished by the hewing, facing, and superposition of the stones of the Pyramids that these structures were built by men has no greater weight than the evidence that the chalk was built by *Globigerinæ;* and the belief that those ancient pyramid builders were terrestrial and air-breathing creatures like ourselves, is not better based than the conviction that the chalk makers lived in the sea.

But as our belief in the building of the Pyramids by men is not only grounded on the internal evidence afforded by these structures, but gathers strength from multitudinous collateral proofs, and is clinched by the total absence of any reason for a contrary belief; so the evidence drawn from the *Globigerinæ*, that the chalk is an ancient sea bottom, is fortified by innumerable independent lines of evidence; and our belief in the truth of the conclusion to which all positive testimony tends receives the like negative justification from the fact that no other hypothesis has a shadow of foundation.

It may be worth while briefly to consider a few of these collateral proofs that the chalk was deposited at the bottom of the sea.

The great mass of the chalk is composed, as we have seen, of the skeletons of *Globigerinæ*, and other simple organisms, embedded in granular matter. Here and there, however, this hardened mud of the ancient sea reveals the remains of higher animals which have lived and died, and left their hard parts in the mud, just as the oysters die and leave their shells behind them in the mud of the present seas.

There are certain groups of animals at the present day which are never found in fresh waters, being unable to live anywhere but in the sea. Such are the corals: those corallines which are called *Polyzoa;* those creatures which fabricate the lamp-shells, and are called *Brachiopoda;* the pearly *Nautilus*, and all animals allied to it, and all the forms of sea-urchins and star-fishes.

Not only are all these creatures confined to salt water at the present day, but so far as our records of the past go, the conditions of their existence have been the same; hence their occurrence in any deposit is as strong evidence as can be obtained that that deposit was formed in the sea. Now the remains of animals of all the kinds which have been enumerated occur in the chalk in greater or less abundance, while not one of those forms of shell fish which are characteristic of fresh water has yet been observed in it.

When we consider that the remains of more than three thousand distinct species of aquatic animals have been discovered among the fossils of the chalk, that the great majority of them are of such forms as are now met with only in the sea, and that there is no reason to believe that any one of them inhabited fresh water—the collateral evidence that the chalk represents an ancient sea bottom acquires as great force as the proof derived from the nature of the chalk itself. I think you will now allow that I did not overstate my case when I asserted that we have as strong grounds for believing that all the vast area of dry land, at present occupied by the chalk, was once at the bottom of the sea, as we have for any matter of history whatever; while there is no justification for any other belief.

No less certain it is that the time during which the countries we now call southeast England, France, Germany, Poland, Russia, Egypt, Arabia, Syria, were more or less completely covered by a deep sea, was of considerable duration.

We have already seen that the chalk is, in places, more than a thousand feet thick. I think you will agree with me that it must have taken some time for the skeletons of animalculæ of a hundredth of an inch in diameter to heap up such a mass as that. I have said that throughout the thickness of the chalk the remains of other animals are scattered. These remains are often in the most exquisite state of preservation. The valves of the shell fishes are commonly adherent; the long spines of some of the sea-urchins, which would be detached by the smallest jar, often remain in their places. In a word, it is certain that these animals have lived and died when the place which they now occupy was the surface of as much of the chalk as had then been deposited; and that each had been covered up by the layer of *Globigerina* mud, upon which the creatures embedded a little higher up have, in like manner, lived and died. But some of these remains prove the existence of reptiles of vast size in the chalk sea. These lived their time, and had their ancestors and descendants—which assuredly implies time, reptiles being of slow growth.

There is more curious evidence, again, that the process of covering up, or, in other words, the deposit of *Globigerina* skeletons, did not go on very fast. It is demonstrable that an animal of the cretaceous sea might die, that its skeleton might lie uncovered upon the sea bottom long enough to lose all its outward coverings and appendages by putrefaction; and that, after this had happened, another animal might attach itself to the dead and naked skeleton, might grow to maturity, and might itself die before the calcareous mud had buried the whole.

Cases of this kind are admirably described by Sir Charles Lyell. He speaks of the frequency with which geologists find in the chalk a fossilized sea-urchin, to which is attached the lower valve of a *Crania*. This is a kind of shell fish, with a shell composed of two pieces, of which, as in the oyster, one is fixed and the other free.

"The upper valve is almost invariably wanting, though occasionally found in a perfect state of preservation in the white chalk at some distance. In this case we see clearly that the sea urchin first lived from youth to age, then died and lost its spines, which were carried away. Then the young *Crania* adhered to the bad shell, grew and perished in its turn; after which the upper valve was separated from the lower, before the Echinus became enveloped in chalky mud.

A specimen in the Museum of Practical Geology in London, still further prolongs the period which must have elapsed between the death of the sea-urchin and its burial by the *Globigerina*. For the outward face of the valve of a *Crania*, which is attached to a sea-urchin (*Micraster*), is itself overrun by an incrusting coralline, which spreads thence over more or less of the surface of the sea-urchin. It follows that, after the upper valve of the *Crania* fell off, the surface of the attached velve must have remained exposed long enough to allow of the growth of the whole coralline, since corallines do not live embedded in mud.

The progress of knowledge may one day enable us to deduce from such facts as these the maximum rate at which the chalk can have accumulated, and thus to arrive at the minimum duration of the chalk period. Suppose that the valve of the *Crania*, upon which a coralline has fixed itself in the way just described, is so attached to the sea-urchin that no part of it is more than an inch above the face upon which the sea-urchin rests. Then, as the coralline could not have fixed itself if the *Crania* had been covered up with chalk mud, and could not have lived had itself been so covered, it follows that an inch of chalk mud could not have accumulated within the time between the death and decay of the soft parts of the sea-urchin and the growth of the coralline to the full size which it has attained. If the decay of the soft parts of the sea-urchin, the attachment, growth to maturity, and decay of the *Crania* and the subsequent attachment and growth of the coralline took a year (which is a low estimate enough), the accumulation of the inch of chalk must have taken more than a year; and the deposit of a thousand feet of chalk must consequently have taken more than twelve thousand years.

The foundation of all this calculation, is, of course, a knowledge of the length of time the *Crania* and the coralline needed to attain their full size; and on this head precise knowledge is at present wanting. But there are circumstances which tend to show that nothing like an inch of chalk has accumulated during a life of a *Crania*; and, on any probable estimate of the length of that life, the chalk period must have had a much longer duration than that thus roughly assigned to it.

Thus, not only is it certain that the chalk is the mud of an ancient sea bottom, but it is no less certain that the chalk sea existed during an extremely long period, though we may not be prepared to give a precise estimate of the length of that period in years. The relative duration is clear, though the absolute duration may not be definable. The attempt to affix any precise date to the period at which the chalk sea began or ended its existence is baffled by difficulties of the same kind. But the relative age of the cretaceous epoch may be determined with as great ease and certainty as the long duration of that epoch.

You will have heard of the interesting discoveries recently made, in various parts of Western Europe, of flint implements, obviously worked into shape by human hands, under circumstances which show conclusively that man is a very ancient denizens of these regions.

It has been proved that the old populations of Europe, whose existence has been revealed to us in this way, consisted of savages, such as the Esquimaux are now: that, in the country which is now France, they hunted the reindeer, and were familiar with the ways of the mammoth and the bison. The physical geography of France was in those days different from what it is now—the river Somme, for instance, having cut its bed a hundred feet deeper between that time and this; and it is probable that the climate was more like that of Canada or Siberia than that of Western Europe.

The existence of these people is forgotton even in the traditions of the oldest historical nations. The name and fame of them had utterly vanished until a few years back; and the amount of physical change which has been effected since their day renders it more than probable that, venerable as are some of the historical nations, the workers of the chipped flints of Hoxne or of Amiens are to them as they are to us in point of antiquity.

But, if we assign to these hoar relics of long vanished generations of men the greatest age that can possibly be claimed for them, they are not older than the drift of boulder clay, which, in comparison with the chalk, is a very juvenile deposit. You need go no further than your own seaboard for evidence of this fact. At one of the most charming spots on the coast of Norfolk, Cromer, you will see the boulder clay forming a vast mass, which lies upon the chalk, and must consequently have come into existence after it. Huge boulders of chalk are, in fact, included in the clay, and have evidently been brought to the position they now occupy by the same agency as that which has planted blocks of syenite from Norway side by side with them.

The chalk, then, is certainly older than the boulder clay. If you ask how much, I will again take you no further than the same spot upon your own coasts for evidence. I have spoken of the boulder clay and drift as resting upon the chalk. That is not strictly true. Interposed between the chalk and the drift is a comparatively insignificant layer containing vegetable matter. But that layer tells a wonderful history. It is full of stumps of trees standing as they grew. Fir trees are there with their cones, and hazel bushes with their nuts; there stand the stools of oak and yew trees, beeches and alders. Hence this stratum is appropriately called the "forest bed."

It is obvious that the chalk must have been upheaved and converted into dry land before the timber trees could grow upon it. As the bolls of some of these trees are from two to three feet in diameter, it is no less clear that the dry land thus formed remained in the same condition for long ages. And not only do the remains of stately oaks and well-grown firs testify to the duration of this condition of things, but additional evidence to the same effect is afforded by the abundant remains of elephants, rhinoceroses, hippopotamuses, and other great wild beasts, which it has yielded to the zealous search of such men as the Rev. Mr. Gunn.

When you look at such a collection as he has formed, and bethink you that these elephantine bones did veritably carry their owners about, and these great grinders crunch in the dark woods of which the forest bed is now the only trace, it is impossible not to feel that they are as good evidence of the lapse of time as the annual rings of the tree stumps.

Thus there is a writing upon the wall of cliffs at Cromer, and whoso runs may read it. It tells us, with an authority which cannot be impeached, that the ancient sea bed of the chalk sea was raised up and remained dry land until it was covered with forest, stocked with the great game whose spoils have rejoiced your geologists. How long it remained in that condition cannot be said; "but the whirligig of time brought its revenges" in those days as in these. That dry land, with the bones and teeth of generations of long-lived elephants, hidden away among the gnarled roots and dry leaves of its ancient trees, sank gradually to the bottom of the icy sea, which covered it with huge masses of drift and boulder clay. Sea beasts, such as the walrus, now restricted to the extreme north, paddled about where birds had twittered among the topmost twigs of the fir trees. How long this state of things endured we know not, but at length it came to an end. The upheaved glacial mud hardened into the soil of modern Norfolk. Forests grew once more, the wolf and the beaver replaced the reindeer and the elephant; and at length what we call the history of England dawned.

Thus you have, within the limits of your own county, proof that the chalk can justly claim a very much greater antiquity than even the oldest physical traces of mankind. But we may go further, and demonstrate, by evidence of the same authority as that which testifies to the existence of the father of men, that the chalk is vastly older than Adam himself.

The Book of Genesis informs us that Adam, immediately upon his creation, and before the appearance of Eve, was placed in the Garden of Eden. The problem of the geographical position of Eden has greatly vexed the spirits of the learned in such matters, but there is one point respecting which, so far as I know, no commentator has ever raised a doubt. This is, that of the four rivers which are said to run out of it, Euphrates and Hiddekel are identical with the rivers now know by the names of Euphrates and Tigris.

But the whole country in which these mighty rivers take their origin, and through which they run, is composed of rocks which are either of the same age as the chalk, or of later date, so that the chalk must not only have been formed, but after its formation the time required for the deposit of these later rocks, and for their upheaval into dry land, must have elapsed, before the smallest brook which feeds the swift stream of "the great river, the river of Babylon," began to flow.

Thus evidence which cannot be rebutted, and which need not be strengthened, though if time permitted I might indefinitely increase its quantity, compels you to believe that the earth, from the time of the chalk to the present day, has been the theater of a series of changes as vast in their amount as they were slow in their progress. The area on which we stand has been first sea and then land for at least four alternations, and has remained in each of these conditions for a period of great length.

Nor have these wonderful metamorphoses of sea into land, and of land into sea, been confined to one corner of England. During the chalk period, or "cretaceous epoch," not one of the present great physical features of the globe was in existence. Our great mountain ranges, Pyrenees, Alps, Himalayas, Andes, have all been upheaved since the chalk was deposited, and the cretaceous sea flowed over the sites of Sinai and Ararat.

All this is certain, because rocks of cretaceous or still later

date have shared in the elevatory movements which gave rise to these mountain chains, and may be found perched up, in some cases, many thousand feet high upon their flanks. And evidence of equal cogency demonstrates that, though in Norfolk the forest bed rests directly upon the chalk, yet it does so, not because the period at which the forest grew immediately followed that at which the chalk was formed, but because an immense lapse of time, represented elsewhere by thousands of feet of rock is not indicated at Cromer.

I must ask you to believe that there is no less conclusive proof that a still more prolonged succession of similar changes occurred before the chalk was deposited. Nor have we any reason to think that the first term in the series of these changes is known. The oldest sea beds preserved to us are sands, and mud, and pebbles, the wear and tear of rocks which were formed in still older oceans.

But, great as is the magnitude of these physical changes of the world, they have been accompanied by a no less striking series of modifications in its living inhabitants.

All the great classes of animals, beasts of the field, fowls of the air, creeping things, and things which dwell in the waters, flourished upon the globe long ages before the chalk was deposited. Very few, however, if any, of these ancient forms of animal life were identical with those which now live. Certainly, not one of the higher animals was of the same species as any of those now in existence. The beasts of the field in the days before the chalk were not our beasts of the field, nor the fowls of the air such as those which the eye of man has seen flying, unless his antiquity dates further back than we at present surmise. If we could be carried back into those times, we should be as one set down suddenly in Australia before it was colonized. We should see mammals, birds, reptiles, fishes, insects, snails, and the like, clearly recognizable as such, and yet not one of them would be just the same as those with which we are familiar, and many would be extremely different.

From that time to the present the population of the world has undergone slow and gradual but incessant changes. There has been no grand catastrophe—no destroyer has swept away the forms of life of one period, and replaced them by a totally new creation; but one species has vanished and another has taken its place; creatures of one type of structure have diminished, those of another have increased, as time has passed on. And thus, while the differences between the living creatures of the time before chalk and those of the present day appear startling, if placed side by side, we are led from one to the other by the most gradual progress, if we follow the course of Nature through the whole series of those relics of her operations which she has left b-hind.

And it is by the population of the chalk sea that the ancient and the modern inhabitants of the world are most completely connected. The groups which are dying out flourish side by side with the groups which are now the dominant forms of life.

Thus the chalk contains remains of those strange flying and swimming r-ptiles, the pterodactyl, the ichthyosaurus, and the plesiosaurus, which are found in no later deposits, but abounded in preceding ages. The chambered shells called ammonites and belemnites, which are so characteristic of the period preceding the cretaceous, in like manner die with it.

But amongst these fading remainders of a previous state of things are some very modern forms of life, looking like Yankee peddlers among a tribe of Red Indians. Crocodiles of modern type appear; bony fishes, many of them very similar to existing species, almost supplant the forms of fish which predominate in more ancient seas; and many kinds of living shell fish first became known to us in the chalk. The vegetation acquires a modern aspect. A few living animals are not even distinguishable as species from those which existed at that remote epoch. The *Globigerina* of the present day, for example, is not different specifically from that of the chalk; and the same may be said of many other *Foraminifera*. I think it probable that critical and unprejudiced examination will show that more than one species of much higher animals have had a similar longevity, but the only example which I can at present give confidently is the snake's head lamp-shell (*Terebratulina caput serpentis*), which lives in our English seas and abounded (as *Terebratulina striata* of authors) in the chalk.

The longest line of human ancestry must hide its diminished head before the pedigree of this insignificant shell fish. We Englishmen are proud to have an ancestor who was present at the Battle of Hastings. The ancestors of *Terebratulina caput serpentis* may have been present at a battle of *Ichthyosauriæ* in that part of the sea which, when the chalk was forming, flowed over the site of Hastings. While all around has changed, this *Terebratulina* has peacefully propagated its species from generation to generation, and stands to this day as a living testimony to the continuity of the present with the past history of the globe.

Up to this moment I have stated, so far as I know, nothing but well authenticated facts, and the immediate conclusions which they force upon the mind.

But the mind is so constituted that it does not willingly rest in facts and immediate causes, but seeks always after a knowledge of the remoter links in the chain of causation.

Taking the many chances of any given spot of the earth's surface, from sea to land and from land to sea, as an established fact, we cannot refrain from asking ourselves how these changes have occurred. And when we have explained them—as they must be explained—by the alternate slow movements of elevation and depression which have affected the crust of the earth, we go still further back and ask Why these movements?

I am not certain that any one can give you a satisfactory answer to that question. Assuredly I cannot. All that can be said for certain is, that such movements are part of the ordinary course of nature, inasmuch as they are going on at the present time. Direct proof may be given that some parts of the land of the northern hemisphere are at this moment insensibly rising and others insensibly sinking; and there is indirect but perfectly satisfactory proof, than an enormous area now covered by the Pacific has been deepened thousands of feet since the present inhabitants of the sea came into existence.

Thus there is not a shadow of a reason for believing that the physical changes of the globe in past times have been effected by other than natural causes.

Is there any more reason for believing that the concomitant modifications in the forms of the living inhabitants of the globe have been brought about in other ways?

Before attempting to answer this question, let us try to form a distinct mental picture of what has happened in some special case.

The crocodiles are animals which, as a group, have a vast antiquity. They abounded ages before the chalk was deposited; they throng the rivers in warm climates at the present day. There is a difference in the form of the joints of the backbone, and in some minor particulars, between the crocodile of the present epoch and those which lived before the chalk; but in the cretaceous epoch, as I have already mentioned, the crocodiles had assumed the modern type of structure. Notwithstanding this, the crocodiles of the chalk are not identically the same as those which lived in the times called "older tertiary," which succeeded the cretaceous epoch; and the crocodiles of the older tertiaries are not identical with those of the newer tertiaries, nor are these identical with existing forms. (I leave open the question whether particular species may live on from epoch to epoch). Thus each epoch has had its peculiar crocodiles, though all since the chalk have belonged to the modern type, and differ simply in their proportions, and in such structural particulars as are discernible only to trained eyes.

How is the existence of this long succession of different species of crocodiles to be accounted for?

Only two suppositions seem to be open to us—either each species of crocodiles has been specially created, or it has arisen out of some pre-existing form by the operation of natural causes.

Choose your hypothesis; I have chosen mine. I can find no warranty for believing in the distinct creation of a score of successive species of crocodiles in the course of countless ages of time. Science gives no countenance to such a wild fancy; nor can even the perverse ingenuity of a commentator pretend to discover this sense, in the simple words in which the writer of Genesis records the proceedings of the fifth and sixth days of the Creation.

On the other hand, I see no good reason for doubting the necessary alternative, that all these varied species have been evolved from pre-existing crocodilian forms by the operation of causes as completely a part of the common order of nature as those which have effected the changes of the inorganic world.

Few will venture to affirm that the reasoning which applies to crocodiles loses its force among other animals, or among plants. If one series of species has come into existence by the operation of natural causes, it seems folly to deny that all may have arisen in the same way.

A small beginning has led us to a great ending. If I were to put the bit of chalk with which we started, into the hot but obscure flame of burning hydrogen, it would presently shine like the sun. It seems to me that this physical metamorphosis is no false image of what has been the result of our subjecting it to a jet of fervent though no wise brilliant thought to-night. It has become luminous, and its clear rays penetrating the abyss of the remote past, have brought within our ken some stages of the evolution of the earth. And in the shifting "without haste, but without rest" of the land and sea, as in the endless variation of the forms assumed by living beings, we have observed nothing but the natural product of the forces originally possessed by the substance of the universe.

THE BEST MODES OF TESTING THE POWER AND ECONOMY OF STEAM ENGINES.

BY CHARLES E. EMERY, LATE OF THE U. S. NAVY AND U. S. STEAM EXPANSION EXPERIMENTS.

Read before the Polytechnic branch of the American Institute, Oct. 22, 1868.

It is unnecessary for us to do more than simply call attention to the extended usefulness of the steam engine. It is the only motor that has successfully competed with or supplanted the changeable and uncertain power derived from animal muscle, and the natural forces of wind and water, and its varied adaptations and applications have brought it into general use throughout the civilized world—not only in stupendous water works and manufactories and in furnishing reliable and rapid communication by land and sea, but also in reducing the physical exertions of both sexes in the less grand but more important operations of the producing community in the forest, field, and farm house.

Surely, then, the steam engine is not an experiment. Years ago it was made a success, and soon became a necessity; and notwithstanding the grand discoveries that have been made in theoretical and practical science, the steam engine has to this day remained unchanged in every important particular. The principal advance has been in the perfection and general adoption of the simple high pressure engine. Many of the so-called improvements, were mere variations in form and in the details of construction, which often failed to produce as economical results as older well-tried mechanism. Nearly all the true improvements have been in workmanship and in adaptations and applications to various uses. A few of the general principles which influence the economy of the steam engine have long been known; and our manufacturers have, in very many cases, claimed a superiority for their engines on account of alleged excellence in the details of the valve gear, or other mechanism, designed to secure the results promised by theory—forgetting that theoretical propositions are of little value unless all the conditions assumed are the same as those in practice, which is rarely the case. It therefore often happens that engines which, in the opinion of the educated engineer, possess many of the elements considered necessary for economical working, do not have those elegant, moving details which fix the attention of the amateur and delight the eye of the skillful mechanic. Business men seek only to sell, and therefore push into chief importance such points as the purchaser can see and understand. Statements are made also regarding actual performance, but they cannot be considered impartial, because the trials upon which they are founded are made by interested parties, with no competition present. We have therefore to conclude that the purchaser of a steam engine has to base his selection, almost exclusively, upon the excellence of simple mechanical details; and having done this, if the engine works well, and especially if it does better than the old neglected one, with its worn out boilers, he is entirely self-satisfied, and ready to sign a recommendation to the public of the engine which *he* has selected, thereby benefiting the manufacturer and flattering his own vanity. But little true progress can be made in this way, as each manufacturer and purchaser knows little more than the result of his own experience.

To bring the steam engine to a high standard of efficiency, accurate comparative trials should be publicly made of every different system of construction. This would be most satisfactory, if it could be done in the same place, doing the same work, under the same circumstances. This would require the erection of costly experimental fixtures, which could be done by private enterprise, for expected gains, or by the combination of several wealthy manufacturers; or, better still, by some scientific organization. The majority of cases must, however, be reached, by trying the steam machinery in the actual performance of the duty for which it has been purchased. We desire, then, in our present inquiry, to ascertain methods and means to test the power and economy of the steam engine in a strictly scientific manner, which shall be above criticism, and also under the practical circumstances of every day use.

We propose, first, to mention some of the terms in general use on the subject; then to discuss the ways and means employed to measure the power and its cost, and afterward to select proper units of comparison, and point out the manner of their practical application.

A steam engine is simply a heat engine. The heat evolved by the combustion of fuel is imparted in the boiler, to water, separating and agitating its molecules, and thus forming steam. The steam exerts pressure, varied according to its density, upon all sides of the vessels in which it is inclosed. This pressure or force is measured in pounds per square inch. The elastic force of the steam, acting upon the engine piston, produces motion, which is measured in feet. The combined effects of force, acting through distance, produce mechanical work, which is measured in foot pounds. The number of foot pounds which an engine is capable of developing, in a given time, expresses the power of the engine. The unit of the power is one horse power, the value of which is conventionally fixed at 33,000 foot pounds per minute.

In proportioning steam machinery for any particular purpose, the first thing to settle upon is the amount of power required; and this being fixed in all cases within certain limits, the practical question is, to obtain a certain power, at the least possible cost.

We will first discuss the ways and means used to measure and determine

I. THE POWER.

It has been said the power of an engine depends upon the work done in a given time; and as work implies force and motion, we must ascertain three things before we can calculate the power; namely, the mean force and the distance through which it is exerted, also the time required for the movement. Having these, we first ascertain the distance moved per minute; and this, multiplied by the mean force, gives the number of foot pounds per minute, which, divided by 33,000, gives the horse power. The distance through which the force is exerted is usually calculated from the number of revolutions made per minute by the engine, which can be ascertained approximately by actual count, but better by means of a register. The speed of the engine is varied more or less by every change in the load, or in the pressure of steam, even when a governor is used; for a change in speed must take place before the governor can operate. The variations are small, with sensitive regulators, but in a majority of cases would materially affect the result. The true plan, then, is to attach a register to the engine, the indications of which should be taken once an hour to check mistakes; and in the calculations, the revolutions per minute should be an average for the whole time through which the trial extends. If the power is to be calculated from the pressure on the piston, the piston movement is also used and ascertained by multiplying the revolutions per minute by double the stroke of the engine, when the latter is double acting. When the tension of a belt, or series of springs, is to be used in calculating the power, the movement of each must also be found, and may be calculated from the speed of the engine. It will thus be seen that two elements of the power are easily ascertained; namely, the time and the distance through which the

force is exerted. The mean driving force is more difficult to obtain. There are two instruments in use for measuring this, namely, the indicator and dynamometer. These two names are used in this paper in a restricted sense. The first is applied only to the well known steam engine indicator, and the latter to that form of dynamometer which is used to measure the force transmitted by revolving wheels or shafts.

It would be impossible, in the limits of this paper, to give a detailed description of the indicator. We therefore will mention only such features as are necessary to explain its mode of operation. The indicator is so constructed and attached that steam from the main cylinder presses upon one side of a small piston in the instrument, the atmospheric pressure being upon the other side. To the indicator piston is attached a spring and a pencil, the latter arranged to mark on paper. The predominating pressure on the indicator piston, whether of the steam or of the atmosphere, extends or compresses the spring in proportion to the intensity of the pressure, and moves the pencil up and down on the paper. The paper is arranged on a drum, which is so connected that it has a side motion corresponding to that of the engine piston. Consequently, as the engine piston moves the paper is moved sideways, and, as the pressure changes, the pencil is correspondingly moved up and down; so that the figure or diagram traced on the paper is a combination of the two movements, and should show the pressure at each and all points of the stroke. The mean of a number of ordinates on the diagram represents the mean pressure per square inch of piston, which, multiplied by the area of the piston, gives the total force which produces the piston movement, from which the power may be calculated, as has been before explained. The indicator is a beautiful instrument, of such great value to the steam engineer that it may be said to deserve the numerous words that have been spoken in its praise. Still, in many cases where it has hitherto been considered practicaliy perfect, its indications are of the most deceitful and unreliable character. It shows very perfectly whether the valves are adjusted properly; and often, when applied to an engine which is working improperly, a mere glance at the diagram will reveal the difficulty, and suggest the remedy. Large leaks in the valves or piston may also be detected in this way. The indicated pressure at the end of the stroke has very often been employed to determine the quantity of steam used by the engine. Calculations founded on such a basis are entirely worthless, as will be explained when treating of the cost of the power. It has often been attempted, also, to calculate the friction from indicator friction diagrams; but the system is practically erroneous, as will be explained hereafter. The indicator is chiefly employed, however, to determine the power of an engine, it being supposed that the diagram shows correctly the pressure at all parts of the stroke. Even this it fails to do under certain circumstances. The moving parts of the instrument must have weight and friction, and some force is necessarily required to overcome the latter, and put the mass in motion. If, therefore, the pressure be ascending, the indicator will show less than it should; and when the pressure is descending, the instrument will show more than it ought. In either case, then, the length of the ordinates is increased during any change of pressure, whence the mean pressure indicated is greater than actually existed in the cylinder. Until quite recently we supposed that these inaccuracies were too small to require serious attention. Experiment has, however, proved the contrary.

To be continued.]

THE NATURAL AND THE ARTIFICIAL.

All artificial forms have sprung from natural forms. The proof of this is simple. Imagination is the grouping together of remembered images. Forms thus imagined, and constructed, although as a whole they may differ from anything else known, still are derived forms, so far as their elements are concerned. The first objects ever copied by man must have been natural forms. The grouping together of these gave new patterns for imitation, and the re-grouping of secondary forms others, and so on until those now in vogue in various departments of the arts were obtained.

A principal element in a good design is that the suggestive forms, the elements of the composition, should be so combined that no single one is conspicuously shown. If the contrary is the case, there is a want of harmony—of tone; the eye is carried from a general to a particular effect; from the result to one of the means intended to produce the result. Hence in the composition of designs for dress patterns, paper hangings, etc., it is rare that natural forms and colors of objects are preserved. The form may be retained and the color altered, or *vice versa*; or both may be modified to suit the general character of the design.

A chaste design always subordinates details to general effect. To this end a rose is often painted green or blue; blackberries may be represented as growing upon grapevines; any other incongruity may form a part of the composition. It is evident then that the profession of a designer in any department of the arts, requires great skill and judgment. There is only a short step from the harmonious and tasteful to the monstrous and disgusting; and the multiplication of new combinations, to the extent required in some departments of industry, calls for talents of a very rare and peculiar type. Especially is this the case in the manufacture of prints, and paper hangings, and a close scrutiny and criticism of the patterns of such goods exposed for sale in the shop windows, will soon convince the observer that a truly chaste and harmonious conception, is the exception not the rule. It is hardly possible from the circumstances of the case that this could be otherwise, but it is equally obvious, that there is much room for improvement in these designs,—not impossible improvement, but such as might easily and profitably be made.

HANCOCK'S SCREW PROPELLER.

The many advantages offered by screw propulsion over the paddle-wheel system have led to innumerable improvements and modifications in the former principle. Some of these are to be taken for what they are worth—which is little or nothing—while others possess a practical value which has led to their adoption. Among the most recent inventions in this direction, and one which has given the most signally successful results under competitive trials, is the screw propeller of Messrs. F. and C. Hancock, of Dudley. This screw has recently been tried against a two-bladed Smith's screw with results entirely in favor of the former. In the interests of steam navigation, we propose to place before our readers all the facts we have obtained respecting the trial, feeling assured that the Hancock screw embodies elements of superiority which entitle it to every consideration, and which there is every reason to believe will place it before every other competitor. The trial in question took place in a steam tug belonging to the Shropshire Union Canal Company, on one of their lines of water near Wolverhampton. This company for some years used a Griffith's screw in their tugs, but the results being unsatisfactory they instituted a series of experiments, at a cost of several thousand pounds, with the view of obtaining an efficient screw propeller. These experiments led to the adoption of a two-bladed Smith's screw, the blades each filling a quadrant of the whole circle, so that the entire screw area is equal to half the area of the circumscribing circle. No other form of propeller, Messrs. Hancock's alone excepted, has given such good results as this on the Shropshire Union Canal, and it was one of these against which the Hancock screw recently competed. The same boat was used in all cases, the screws only having been changed as required. The screw shaft makes two revolutions while the screw makes three, and the relative speeds of the crank and the propeller shafts remained the same throughout, the screws only being changed.

The Smith screw is 3 feet 1 inch in diameter, 4 feet pitch, and 20 inches along the shaft, and is driven by a double cylinder engine of upwards of 20-horse power. The Hancock screw is of an entirely new curve, as will be seen by the annexed engraving; it revolves from left to right, that is, the concave face moves forward. It is 3 feet in diameter, 6 feet pitch, 6 inches along the shaft, and has two thirds less surface than the Company's screw. The following tabulated statement gives the results of two runs with the tug boat alone, one with the Hancock and the other with the Company's or Smith's screw:

HANCOCK'S SCREW.

	Pressure in boiler in lbs.	Revolutions per minute.	Miles run.	Time in minutes.
First mile, not full steam	22	68	1	21
Second mile, full steam	23	80	1	17
Half mile, full steam	23	80	½	8
Total			2½	46

THE COMPANY'S SCREW.

	Pressure in boiler in lbs.	Revolutions per minute.	Miles run.	Time in minutes.
First mile, full steam	45	115	1	19
Second mile, full steam	45	115	1	21
Half mile, full steam	45	115	½	11
Total			2½	51

It will be seen by the above statement that the Company's screw had double the pressure of steam, and made upward of thirty-five revolutions per minute more than the Hancock screw. It is, therefore, fairly to be inferred that double the quantity of coal was consumed with the former, while a lower rate of speed was speed was obtained than by the latter screw. The value of a screw on a canal is its power to carry weights behind it; experiments were therefore made in towing, and the tug boat took in tow four loaded boats containing 95 tuns of goods. The first run of 2½ miles was made with a four-bladed Hancock screw. The pressure in the boiler was 50 lbs. full pressure; the run was accomplished in 67½ minutes, the engine making 86 revolutions per minute. The Hancock screw was then removed and the Smith screw put on, the boiler pressure remaining the same. The same four boats, with their 95 tuns of cargo on board, were again taken in tow, and the run was accomplished in 65 minutes, the engine making 148 revolutions per minute. From these figures it would appear that nearly the same results were obtained in both cases with a very different consumption of steam, and consequently of fuel, highly in favor of the Hancock screw. In a third experiment with the Hancock screw, the boiler pressure being 60 lbs., the engine made 103 revolutions per minute, and the run of 2½ miles, towing the four boats loaded as before, was accomplished in 55 minutes, upward of half a mile an hour faster than the run with the Company's screw. Such a result was certainly never obtained with the ordinary screw. Although we have no exact figures as to the consumption of fuel, neither were any indicator diagrams taken from the engine, there is evidence of a considerable saving in fuel. As this saving has been realized on the narrow and shallow waters of a canal, we may anticipate similar results with increased speeds in ocean steamers fitted with the new propeller. It should be borne in mind that speed cannot be obtained, however great the power used, in shallow canals where the boat draws four feet of water, as was the case in the present instance, leaving only six or eight inches of water below the bottom of the tug boat. It was found that with the Hancock screw no vibration whatever was experienced, while in all cases with the Company's screw, and in fact with all other screws, considerable vibration results.

It was at one time hoped that a revolution of the screw would be made to give a result analogous to that of a cart-wheel. The wheel revolves upon an unyielding substance, and carries its load the entire length of the revolution, without loss or slip. But as the screw revolves the water yields to its pressure, and the fastest ships in the Royal Navy only obtain a speed of one fourth the margin velocity of the screw with a best Griffith propeller. The small steam launches attached to the navy, fitted with a pair of twin Smith screws, attain in some few cases a speed equal to about one third of the margin velocity of the screw. But then it is only in those cases where the engines are proportionately more powerful than any that could be put into a large ship. The loss of propelling power in the screw is due to the great amount of slip. The long angle screws require too much power, and throw the water sideways. The lighter angles throw the water more in a line with the vessel, but the screw requires a high velocity to obtain speed, and this is one of the great defects our large ships have to contend with. The *Warrior*, with an engine giving out upward of 6,000-horse power, has to work at about 75 revolutions per minute to give the ship its full speed. So high a speed of the engine with so large a power cannot be maintained for long with safety; and this is the general position of our navy and our merchant ships. The Hancock propeller was invented to meet this special point and to remedy this great defect. It proposes to give a higher speed to a ship, and at the same time to greatly reduce the revolutions of the engine. So far as the trials have at present gone, these results have been attained. They go to prove that the engine will work one third slower, and the ship move faster, than with any other screw. To these advantages is to be added the economy of fuel, which is a most important feature in every case. The experiments have been very conclusive in establishing the superiority of the Hancock screw for one class of navigation. That it will prove as efficient in larger vessels, and under different conditions, there is no reason to doubt. But we cannot of course pronounce a decided opinion in the absence of actual trials. The invention is one full of promise, and we shall watch with interest the progress of the Hancock screw, feeling assured, from what has already been done, that if a trial in an ocean vessel were made, and the results carefully noted in detail, such advantages would be shown as would lead to its adoption in all future cases. We look forward with confidence to this result, and in the meantime congratulate the inventors on having inaugurated a new era in the history of screw propulsion.—*Mechanics' Magazine.*

The Water Power of Maine.

The report of the Commissioners appointed to conduct the hydrographic survey of the State of Maine contains some interesting statements. Returns were obtained from 2,015 sites of water power, all located within an area of 14,000 square miles, the entire area of the State being 31,000 square miles. The Penobscot River, in the twelve miles above Bangor, has power equal to 40,000 horses. The Kennebec River has power equal to 32,800, divided as follows: Augusta has 5,000; Waterville, 8,900; Solon, 4,900; Skowhegan, 5,700; Fairfield, 7,300; Anson and Madison, 2,000-horse power. The Androscoggin has power equal to 58,990 horses, divided as follows: Lewiston, 14,500; Brunswick, 8,600; Lisbon, 6,740; Livermore, 3,200; Jay 4,950; Rumford, 21,000. From these figures it appears that the three principal rivers of the State afford power equal to over 130,000 horses. The report gives a total of 450,000, and taking into account the powers not reported, the aggregate water power of the State will not fall short of 1,000,000 horses. Lowell, in Massachusetts, has 9,000-horse power. The water power of Maine indicated above is, in the drouth of summer and at its present stage of development, equal to the working power of 4,000,000 of men, and is twice greater than the power, both steam and water, employed in Great Britain and Ireland, in 1856, in cotton, woolen, worsted, silk, and flax manufacture.

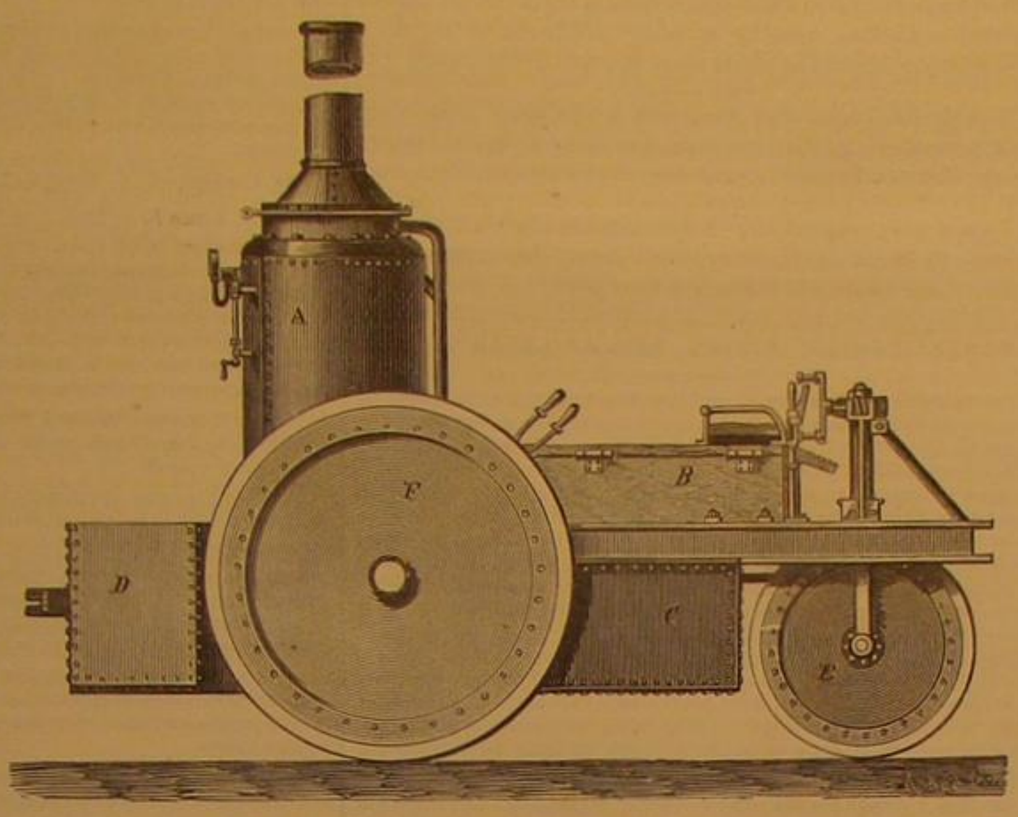
TESTING THE POWER OF STEAM ENGINES.

We commence this week the publication of a paper entitled "The Best Modes of Testing the Power and Economy of Steam Engines," read before the Polytechnic branch of the American Institute, Oct. 22, 1868. The paper is a marked contrast to the majority of the papers, and the discussions which have occupied the time of the Institute for a considerable period, and although exceptions may, and probably will be taken to some of the views of the author, its perusal will be found both interesting and instructive. We therefore strongly urge our readers to give it earnest and candid attention. It will be found that the author, although in the portion of the paper that we publish this week he points out important defects and sources of error in the application and use of the indicator, still claims, as he proceeds with the subject, that this instrument is the only one that can well be universally used for testing steam engines. His directions for its proper use, and the interpretation of its diagrams, are of value to all interested in the subject.

Road Locomotion by Steam.

On page 226, No. 15, current volume, SCIENTIFIC AMERICAN, we published accounts of the performances of a new steamer for traversing common roads and drawing trains of loaded wagons, the principal peculiarity of which is the use of vulcanized rubber tires on the wheels, by which the jolts and obstructions owing to unevenness of surface of the roadway are avoided and overcome. The trials, which appear to have been very satisfactory tests, were made at Edinburgh and Leith, Scotland, in the first instance by drawing a train of coal carriages over paved roads, up and down steep inclines, and around curves and corners; and in the second case the locomotive running over a grass field and over loose earth, lightly laid to the depth of from twelve to twenty-four inches. The weight of the machine used was between four and five tuns, yet in passing over the loose earth the weight compressed it so little that a walking stick could easily be pushed down in the track of the wheels,-without marked exertion.

The accompanying engraving we copy from the London *Mechanics' Magazine*. The boiler, A, is an improved vertical boiler evaporating 4·68 lbs. of water to one pound of inferior Scotch coal, for 3·66 lbs. to one pound of the same coal in the ordinary upright boiler. B is the casing of the engine, C the water tank, and D the coal bunker. E is the steering wheel, with a rubber tire twelve inches wide by four and a half inches thick. The main driving wheels, F, connected to the engine by suitable gearing, have tires of rubber fifteen inches in width by five inches thick.



THE THOMPSON ROAD STEAMER.

A number of trials have lately been completed, with a powerful road steamer, which has been constructed for hauling wagons loaded with coffee over the hilly roads in the island of Ceylon. This steamer has two cylinders, each seven and a half inches diameter by ten inches stroke, and a vertical boiler three feet diameter by seven and a half feet high. The engine is arranged with gearing to make either six or fifteen revolutions to each revolution of the driving wheels. The machine weighs, with water and coal for two hours' work, about eight and a half tuns. It was intended to haul twelve tuns gross weight up gradients of one in sixteen. It was found, however, on trial that it was capable of doing a great deal more than the stipulated amount of work.

Bleaching of Tissues.

Some recent researches by M. Kolb on the bleaching of tissues will be found of interest to those engaged in this department of the arts. We give a condensed account of these experiments as contained in the London *Chemical News*.

Flax was the fiber chiefly experimented with, alkalies being the reagents whose effects were studied, the object being to fix precisely the nature of the substance which passes by the name of resin, gummy mater, gum-resin, saponifiable matter, etc. Elementary analysis gave no information; it gave figures which closely approached the percentage composition of cellulose. The employment of various solvents used in organic chemistry, on the contrary, led to certain conclusions by a chain of facts. The fiber after treatment with alkalies furnished strongly colored lyes, which had a certain tendency to mold; this result suggested the idea of a saponification, and led to the examination, as solvents, of alcohol, ether, and essential oils. The yellow coloring matter is completely insoluble, and these liquids only remove from the fiber a white fatty matter and a green essence, the penetrating odor of which is found slightly perceptible in bleachers' lyes. The whole only constitutes 48 per cent of the weight of the fiber, and is the portion really saponifiable in caustic alkalies; the alkaline carbonates leave this fatty matter in the fiber, which becomes at the same time, more supple. After exhaustion by alcohol, the fiber, boiled in weak potash, soda or ammonia solution, gave, in three cases, a loss in weight of 22 per cent. Carbonate of soda posesses exactly the same solvent power, but it acts more slowly. The brown lyes thus obtained, neutralized by hydrochloric acid, give a brown gelatinous precipitate; but the coloration of the liquid still indicates the incompleteness of the precipitation. Neither acid in excess, nor lime of baryta, will precipitate that which remains of the coloring matter in solution. This soluble portion varies according to the amount of alkali, and especially according to the duration of the ebullition; thus twelve hours' ebullition with ammonia suffices for acids to cause no precipitate in the solution. The fiber treated by boiling water, loses at the end of a week 16 per cent of its weight, and 18 per cent when pressure intervenes; the matter dissolved is acid to litmus, colors the water slightly, and possesses the singular property of browning by simple contact with alkali.

Considering these first characters, it is difficult to admit the presence of a resinous matter. Caustic alkalies or alkaline carbonates do not act as simple solvents, for in boiling the fiber with determinate amounts of carbonate of soda or sulphide of sodium, it was found that after eight hours' ebullition no trace of carbonic acid or hydrosulphuric acid remained. Resins do not give similar results; they saponify equally well with sulphides and alkaline oxides. Lime does not precipitate this substance dissolved by the alkalies; the fiber boiled with milk of lime loses the same weight as in soda, a soluble combination being formed with lime, containing 48 parts of this oxide for 100 of the coloring matter: chalk gives the same result, although more slowly. The treatment by chalk and lime presents this particular—that the solutions obtained remain colorless, and that the precipitates obtained are white. Analysis assigns to the substance, soluble in alkalies and re-precipitated by acids, the following numbers: Hydrogen, 5·0; carbon, 42·8; oxygen, 52·2.

The research has led to the establishment of the following facts: The gummy substance which adheres to the fibers of flax is nothing else than pectose. The soaking or steeping of the fiber appears to have for its object the determination of the pectic fermentation, and the pectic acid which results remains fixed on the flax, either mechanically or in part, in the form of pectate of ammonia. The caustic alkalies in the cold form gelatinous pectates, which preserve the fiber from being completely attacked. Pectic acid being weak, the alkaline carbonates have in the cold only a feeble action upon the fiber. Ebullition, on the contrary, transforms pectic acid into an energetic acid—metapectic acid, the carbonates are then strongly attacked, and their employment becomes as efficacious as that of caustic alkalies. The carbonate of soda, even in large quantity, is not a cause of the weakening of the fiber, which loses more strength from the employment of caustic soda, especially when the lye is concentrated. The employment of lime, even in the cold weakens the fiber considerably. But the chief cause of the destruction of the solidity of the fiber is too long digestion, particularly with caustic soda. M. Kolb says, that, after having proved the existence of pectose in the unsteeped flax, and of pectic acid in the same flax after steeping, it is to be hoped that the attention of chemists will be drawn to the pectic fermentation, well known doubtless as a scientific fact, but of which no one suspected an industrial application of so high importance

The Mechanics of Spiritualism.

The Journal of the Franklin Institute says: "Dr. Peper, of the Polytechnic Institution in London, so well known for his ingenious inventions of the ghost, the floating head, etc., has for some time past employed himself in the development and exhibition at the above named institute of sundry contrivances, by which all the wonders of spiritual manifestations have been not only paralleled but exceeded. One of the most remarkable of these consisted of an arrangement by which various objects and persons were caused to rise in the air, and remain there suspended under conditions which implied the impossibility of any supporting wire however fine and invisible.

"When, however, we mention that in the patent by which these contrivances are secured to their inventors' use a large plate of glass figures as the 'invisible means of support' of these light characters, the wonder of the thing will be somewhat diminished, while the simplicity and ingenuity of the idea may well claim praise. In a foreign scientific journal we see some tricks of the Davenport Brothers are described and are declared inexplicable, and yet we have repeatedly seen performances, involving every important feature of these super human developments, made by an amateur in the arts of legerdemain in the presence of many spectators, and defying all their ingenuity of detection. Yet to those initiated, these feats are as easily reduced to the domain of nature and mechanics as Dr. Peper's wonders when the glass is recognised."

Nothing if not Scientific.

Forney's *Press* tells a good story about bones, which illustrates the power of science in dealing with extraordinary phenomena: In company with a distinguished member of the American Association for the Advancement of Science, we were recently examining the grounds of an Illinois horticulturist. Our horticultural friend evidently had great respect for the *savant*, and received his every word with almost reverent admiration. Picking up an old bone, the learned scientist remarked: "This is the bone of a horse." The farmer looked doubtingly, but did not express dissent. Soon after our learned friend lifted another, and remarked: "This is the bone of an ox." The farmer was astonished, and asked: "Please tell me how you can so easily distinguish one bone from another? Why is this an ox bone?" "Why don't you see," observed the philosopher" where the butcher sawed a steak off of the bone?"

It was well for our learned friend that he was not in a region of horse meat food, or he might have been confounded in his wisdom. As it was, the farmer had only to exclaim that "learning was a wonderful thing;" and for some minutes he was lost in reflection on the astonishing mysteries displayed by the aid of "science."

The Atmosphere.

The Academy of Sciences, in France, has published the result of observations of the atmosphere, made by Camille Flammerton in an extended series of balloon ascensions. The first chapter of the report establishes a law of variation of the watery vapor in the air, and asserts that the invisible moisture accumulates to the maximum zone of humidity and then decreases until it finally disappears. The second chapter shows that the solar radiation increases in the upper regions in proportion to the diminution of the moisture and of the temperature of the air. The third chapter treats of the circulation of the atmospherical currents. The fourth establishes the diminution of the temperature according to the latitude. The fifth gives very curious observations on the altitude of clouds of different forms, their variations, and physical construction. The sixth gives several problems on optics, acoustics and general physics, of which the definite solution is not completed.

Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents.

A Novel Steam Canal Boat.

MESSRS. EDITORS:—In your issue of September 23, you copy an article from the Rochester papers about the new steam canal boat, *Edward Backus*, and as it does not seem to give in all respects a correct idea, I will endeavor to explain it. The boat, *Edward Backus*, was built with the view of overcoming the obstacles that have heretofore made steam on the canal a failure.

It has been demonstrated that a screw or paddle wheel, in as small a water way as the canal, and shoving a boat of the present style of canal boats at the speed of two miles an hour, has a "slip" of about seventy-five per cent; and as this causes a consumption of about two tuns of coal, every twelve hours, and requires a large boiler and engine in proportion to the work done, thereby lessening its carrying capacity, it cannot compete with horses, having direct hold on the ground, and no loss of power. Now, it occurred to me, that if I could run a wheel on the solid ground, at the bottom of the canal, thereby saving this enormous loss of power by slip, and making the amount of power necessary to drive a canal boat conform nearer to the power of two horses on the towing path, I could propel a boat cheaper than with horses. With this object in view, I constructed a boat with a "well" in the center, running through the boat like a box for a center board in a vessel, sixteen feet long, and twenty inches wide, and placed therein a traction wheel eight feet in diameter, and one foot thick. This wheel is hung in a frame, which is hinged at its forward end, allowing it to rise and fall eight feet below the boat; and as the boat, when loaded, draws six feet of water, this wheel can drive the boat when the water is fourteen feet deep; and the frame being hinged three feet above the bottom of the boat, it gives the traction wheel a backward motion as it rises, and as it revolves only seven or eight times a minute, it rolls over stones or other obstructions very easily, and without jar. The back end of the well is enlarged, so as to receive a screw wheel four feet in diameter, for use in deep water, which can be connected with the engines readily, and lowered below the bottom of the boat, the traction wheel lifting and guarding it from injury. This whole machinery occupies no more room than a horse stable, and adding but little weight above that of a team. The boat has made two short trips, and one long one, running the entire length of the canal, and I find nothing in the bottom of the canal to prevent the general adoption of this principle. The boat can be run from Buffalo to Albany, without using the screw wheel more than twenty miles of the entire distance.

The *Backus* has a carrying capacity of two hundred and fifteen tuns, and uses one half a tun of coal in twelve hours, running from two and a half to three miles an hour, and of course making no wash to the banks.

EDWARD BACKUS.

Better Roads Wanted.

MESSRS. EDITORS:—I am inclined to offer a premium of my best good will, at least, to you, or some of your learned contributors, for remarks on the best system of roads and road making.

Can the iron trackway for common roads be made available and practicable to our country at large, or will its great cost prove it, as a scheme, abortive?

If we *must* go on with our common earth roads, "up hill and down," can we not induce travelers to use wide tired vehicles to save them in as good condition as possible?

Will some one give a scientific estimate, through the SCIENTIFIC AMERICAN, of a track in a common road seven feet wide, and of sufficient thickness for all traffic, made of broken

or gravel stones, and duly combined with coal tar or asphaltum, and his opinion of it?

It seems to me that roads are of importance equal to any material interest of our great country, and should share the attention of the press, and of able men, to a greater extent.

All you have done, or can hereafter do, to aid such enterprises, will have the gratitude of at least one of your numerous readers. PATHMASTER.

SPEED OF RAILWAY TRAINS.

A correspondent writes upon the subject of higher speed for railway trains in the United States. His opinion seems to be that the present rates of speed are generally too low to meet the wants of the public; that much higher rates are already talked of, and will shortly be demanded; while he also thinks the machinery of locomotives, and the structure of the rolling stock, too slight to endure an increase of speed with safety.

While it is undoubtedly true that a demand for greater average speed exists on the part of the traveling public, and also that the speed of American trains is generally much lower than the standard of English roads, our correspondent errs in supposing that this is owing to any inferiority in the structure of American locomotives or quality of the rolling stock. Both the locomotives and passenger cars of American manufacture are equal in strength, elegance, and efficiency to any made in the world. Indeed, it may reasonably be doubted whether our passenger cars are equaled by those made in any other country. Our roadways are, however, very inferior to those of England and France, and, until this fault is remedied, the present rates of speed can never be greatly increased with safety.

Foreign railroads are superior to ours in the following respects: First, the roadways are much more firmly constructed at the outset, and are less likely to be injured by frost. Second, there are fewer intersections of railways with each other and with common roads than is the case with us, the practice of undermining being preferred. Third, the lines are kept under a more strict surveilance; they are better fenced, barred and watched than the majority of American roads. Fourth, their bridges are, in general, much more substantial and permanent structures than ours.

These are the reasons why a higher rate of speed is compatible with safety on English roads than is possible with us. Still when grave doubts exists in England whether the rates of speed now maintained on her roads are not too high, and when such men as George Augustus Sala take up the pen to advocate their reduction, sustaining their position, by considerations both of public safety, and comfort, and profit to the companies themselves, it may well be doubted whether upon the inferior railways of the United States a much higher rate is either practicable or desirable. That our railroads cannot be improved so as to approximate in stability the English railways, we do not of course assert. That a speed, under any circumstances, of over from thirty to thirty-five miles per hour, should be made the standard for fast trains we think unreasonable to expect or to demand.

Editorial Summary.

THE oldest house in the United States is believed by some to be a stone edifice in Guilford, Conn. It was built in 1640 the stone being brought on hand-barrows from a ledge at some distance from the site of the building. The cement with which the walls were laid up is said to be harder than the stone itself. The first wedding in Guilford took place in this edifice, the supper provided being pork and peas.

IF storms cannot be predicted, their progress can be communicated, so that preparation can be be made for their approach. The latest proposal is to telegraph to various stations throughout the country the state of the weather, and announce it to the agricultural population by pre-arranged signals, of the discharge of cannon.

CAPITAL OF RAILWAYS.—During the forty-one years which have passed since Stephenson ran his first train on the Stockton and Darlington line, the railways of Great Britain absorbed £500,000,000 of capital, and extended over more than 14,000 miles. In 1865, the length of lines was 13,289 miles, of which more than a third were single lines, and the rest double; this was an increase of 500 miles over the preceding year.

A STEAMER is building in Boston designed to transport molasses from the West Indies. She is to be built in compartments, so as to bring the molasses in bulk, instead of hogsheads as is now the custom, and will have a carrying capacity of eight hundred hogsheads. It is estimated that this method will make a very large saving in the transportation of this article, and if it proves successful, will be generally introduced.

AN avalanche of rocks recently occurred near the Watch House, on Mt. Mansfield, Vt. One huge rock, of a hundred tuns weight, mowed its way through the dense timber for a thousand feet, and only stopped within ten feet of the house. Other enormous fragments rushed through the timber in various directions, their force being shown by the large number of shattered and prostrate forest trees.

A SINGULAR eclipse of the sun will take place on the fifth of November. This is no less than a eclipse of the great luminary by the planet Mercury, of course it will be invisible except to eyes armed by telescopes, and to these only in favored localities of which Paris is one. That city will however have to forego the sensation of the great solar eclipse of 1869, while it be visible in many parts of the United States.

A STATUE of the celebrated Hans Sachs, bootmaker and poet, is about to be erected at Nuremburg. In order to secure the funds necessary, for the inauguration, a lottery is organizing under the direction of the boot and shoe makers of that city, in which all the prizes are to consist of foot gear.

NEWS from Spain is now received at Paris by means of carrier pigeons, telegraphic communication having been interrupted

WE notice that the cultivation of silk is attracting increased attention in Southern California. This is right; there are no natural conditions wanting to make California as thrifty a silk growing district as exists upon the face of the earth.

THE Zouave Jacob, who made such a stir some time since by his mesmeric healing in Paris, has been called to Berlin by the King of Prussia to treat one of the royal family.

THE largest manufactory of shoe pegs in the United States is said to be at Burlington, Vt. It every day transforms 4 cords of wood into 400 bushels of shoe pegs.

MANUFACTURING, MINING, AND RAILROAD ITEMS.

THE PACIFIC RAILROAD EXTENSION.—The Vice President of the Union Pacific Railroad has written a letter to the President of the United States, in which he says:—"The Union Pacific Railroad Company has been informed of the appointment of a special commission to re-examine their road. If this commission includes all roads receiving similar subsidies and bonds, this company will regard the appointment with satisfaction, but if no other road is included, it becomes evident that the Government has listened to representations unfavorable to the character of our work, and which justice requires that I should contradict. I think it my duty, therefore, to assure your Excellency that the Union Pacific Railroad is at least equal to any of these other lines in construction, appointments, and permanent improvements, and that you can easily ascertain the thoroughness and excellence of the work by reference to Generals Grant, Sherman, and Sheridan, who have lately been over the line, and from many other eminent practical railroad men. I respectfully request that the commission be instructed to include all these roads in the examination, and to report in detail the comparative qualities of each."

THE NEW POSTAGE STAMPS.—The Postmaster General has just awarded the contract for the supply of stamps to the department for the ensuing four years to the National Bank Note Company of New York. The new stamps will be somewhat smaller than those in use at present, but they are of a superior style and finish, with a novelty in design. The two cent stamp contains an engraving of a post boy on horseback in full speed. The three cent has a locomotive under full head of steam, the great carrier of our domestic service. The five cent stamp contains a head of Washington. The ten cent, the finest of all in design and execution, has a miniature engraving of the Declaration of Independence, executed with such delicacy and precision that the picture suffers nothing under a magnifying glass. The twelve cent stamp has an ocean steamship, and the thirty cent has a finely executed engraving of the surrender of Burgoyne. When it is considered that over a million stamps are issued daily the importance of this contract is at once evident.

Mr. Jason Clapp, a well known carriage manufacturer at Pittsfield, Mass., died at his residence on the 19th inst., at the age of 85 years. Carriages of his make have been sent to Germany, one to the King of the Sandwich Islands; and the very beautiful one, presented to President Pierce, while in the Presidential chair, by the citizens of New York was built by him.

The cannon foundery of Krupp, in Essen, Prussia, extends over 920 acres, 246 of which are occupied with buildings. It has 12 miles of railroad, 6 locomotives, 150 wagons, and 50 horses. There are 9,000 jets of gas, consuming about five millions of cubic feet per day; 10,000 men are employed in the foundery; 1,200 at the mines and forges. The wages amount to 3,100,000 thalers per annum. The motive power consists of 160 engines of 6,000-horse power each. The daily consumption is 13,000 bushels of coal, 32,500 bushels of coke and coal, and 200,000 cubic feet of water.

A hydrographic survey of Vermont is talked of.

The highest point on the Pacific Railroad is 8,262 feet above the sea.

The rolling mills of Philadelphia pay annually for wages the sum of $1 000,000.

The only glassworks in Indiana are situated at New Albany where larger quantities of bottles are made.

A single firm in Philadelphia employs in the manufacture of gas fixtures 750 hands. Another employs 400 hands.

The extension of the Horicon branch of the Milwaukee and St. Paul Rail-Road has been formally opened at Winneconne.

It is stated that the reduction in prices of freight over the three trunk lines to the West is the result of general understanding, and is intended to run off the various fast freight lines.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

CONDENSER.—Wm. L. Winans, England, and Thomas Winans, Baltimore, Md.—This invention relates to surface condensers of steam engines and consists in the means for preventing the surface of the condenser and the valves of the air pumps in surface condensing engines from being charged, coated, clogged, or obstructed with grease, tallow, or other extraneous matters which may be carried over with the steam from the cylinder into the condenser.

OPERATING WINDOW BLINDS.—Levi W. Swafford, Edward Butler, and John R. Hess, Muscatine, Iowa.—This invention relates to a new and improved method of operating window blinds, whereby the same are opened and shut and the movable slats of the same are adjusted, and blinds are more securely fastened without the necessity of raising the window for that purpose.

HORSE-POWER HAY ELEVATOR.—Amos B. Hunt, Matteson, Mich.—The object of this invention is to provide the means of elevating hay from the wagon and storing the same in the bay or mow of a barn (or lifting hay from the stack and loading the same on a wagon) in a rapid and easy manner with the aid of only two attendants and a horse or other draft animal. It consists in general terms of a swinging crane or sweep bar provided with a lifting rope, pulleys, and catch and tripping devices, together with other devices perfecting the whole.

ROTARY STEAM ENGINE.—Levi F. Goben, Spring Hill, Mo.—This invention relates to certain improvements in rotary engines.

PAPER CUTTING MACHINE.—Hervey Law, Chatham, N. J.—This invention relates to a new and improved machine for cutting paper, and is more especially designed for the use of book binders.

BEEHIVE PROTECTER.—Alfred S Johnson, Naupun, Wis.—This invention relates to a simple and economical device for protecting beehives from the cold of winter and the heat of summer.

CHIMNEY CLEANER.—Michael J. Lourrentz, Leavenworth, Kansas.—This invention relates to a new and simple method of cleaning the chimneys of lamps, and it consists in combining two wires or rods with buttons or heads thereon.

PROCESS OF, AND COMPOSITION FOR TANNING LEATHER.—G. Zippe, New York city.—This invention relates to a new tanning composition, which is so compounded that the leather can be completely tanned in a few days, while heretofore it took months to do it.

STEAM BOILER.—R. W. Humphreys, Clarksville, Tenn.—This invention consists in forming a steam boiler of an annular ring or tube in which are placed tubes or flues for the passage of the products of combustion, and in attaching to the same a fire-box or furnace and a smoke stack.

SUGAR-PAN DERRICK.—J. D. Ayers, East Greensboro, Vt.—The object of this invention is to provide a simple and effective derrick for lifting sugar pans off and on the furnace arches. It consists in the combination of lifting pulleys with a pan frame, which is arranged to slide on a horizontal arm which is raised and lowered by the pulleys, the said arm forming a movable attachment to a rotary upright.

WROUGHT-IRON AND STEEL COLUMNS.—George Walters and Thomas Shaffer, Phœnixville, Pa.—This invention has for its object to furnish an improved column, which may be made of wrought iron or steel, which shall be firm, rigid, strong, and neat in construction, adapting it for use in those parts of a building or structure where neatness of appearance, combined with strength, is required.

CORN PLANTER.—C. W. Thiessan, Effingham, Ill.—This invention relates to a new corn planter, which is so arranged that the wheels contain the seed box and the dropping apparatus, whereby a very secure and regular distribution of the seed is obtained. The invention consists in such an arrangement of adjustable slides, that work on the face of the wheel, in boxes projecting from the face of the wheel, and in such a combination of the same with a seed box secured to the inner of the wheel, that the requisite quantity of seed is dropped during each full, half, or other partial revolution of each wheel, and that such seed is, by such revolution of the wheel, not only dropped, but also securely imbedded in the soil.

REAPING MACHINE.—Miletus J Wine, Long Glade, Va.—The object of this invention is to provide a simple and more efficient means for removing and depositing the gavel.

COMBINED VISE AND ANVIL FOR CIRCULAR SAWS.—David Huffman, Luray, Va.—This invention consists of an anvil and a vise combined, in a neat and portable shape for the purpose of treating saw teeth.

GATE FOR SCUTTLING SHIPS.—John Hall Marshfield, Mass.—The object of this invention is to construct and attach to vessels a gate which can readily be opened for the purpose of scuttling them, and which can, afterward, be as readily closed, when it is desired to pump out and raise the vessel.

ROTARY ENGINE.—Geo. W. Goodwyn, Petersburg, Va.—The object of this invention is to furnish a rotary steam engine which shall be simple and cheap in construction, and shall economize the power of the steam to the greatest possible extent.

CAR BRAKE.—W W. Babcock, Harmar, Ohio.—This invention has for its object to furnish a more simple and powerful car brake than any hitherto employed, and to this end consists in a peculiar combination of the screw with a toggle-joint lever whereby the brakes can be at any time applied by a child with so great force as to instantly stop the wheels.

MOLD BLACKING MACHINE.—Benj. S. Benson, Baltimore, Md.—This invention is an improvement in machines for blacking the molds used in casting metallic pipe, and consists in a new arrangement of the mechanism by which the blacking is fed to the brush through the stem that holds the latter, and is thrown against the walls of the mold from among the bristles of the brush.

PRINTING PRESS.—Royal Cummings, Newport, Vt.—This invention relates to a new and improved printing press of that class in which the paper is printed from a continuous roll, and both sides of the paper at one operation, or during a single passage of the paper through the press.

CORN PLANTER AND CULTIVATOR.—Charles Dyer, Coal Run, Ohio.—This invention relates to a new and improved corn planter and cultivator.

CULTIVATOR.—Jacob H. B. Keller, Chambersburg, Pa.—This inventor relates to a new and improved cultivator and it consists in a novel construction of the same, whereby the device may be used in a rough or stony ground without the liability of breaking or injuring it.

TRACE FASTENING.—James Brown, Mattewan, N. Y.—This invention has for its object to furnish an improved fastening for securing the traces to the whiffletrees, which shall be simple in construction, easily attached and detached, and not liable to become accidentally detached.

WASHING MACHINE.—E. F. O'Neill, Prairie du Chien, Wis.—This invention has for its object to furnish an improved washing machine, simple in construction, easily operated, and effective in operation, doing its work quickly and well, and in such a manner as not to injure the clothes or break the buttons.

BUT HINGE.—Lorenz Maschauer and Wm Frankfurth, Milwaukee, Wis.—This invention relates to a new and useful improvement in but hinges of that class which are provided with a removable or detachable plate to admit of a door, shutter, or gate being unhung without unscrewing either leaf of the buts.

PHOTOGRAPHING ROOM.—George K. Proctor, Salem, Mass.—This invention consists in constructing a room or apartment for photographing purposes, in such a manner or of such a form that the rays of light from a lamp placed within said room or apartment will be reflected and concentrated upon the person or object to be photographed, so that photographing may be successfully performed at night by artificial light, or other than that of the sun.

GRAIN DRILLS.—John T. Lynam, Jeffersonville, Ind.—This invention relates to a new and useful improvement in grain drills.

SWAGE FOR UPSETTING SAW TEETH.—Warren P. Miller, New York city.—This invention relates to a new and improved swage for upsetting saw teeth, bringing the cutting edges of the same to a proper cutting edge and at the same time spreading or expanding the edges of the teeth to a necessary width to insure a free cut of the saw and the ready expulsion of saw dust from the kerf.

SPRING BED BOTTOM.—Thomas J. Gaffney, Detroit, Mich.—This invention has for its object to improve the construction of spring bed bottoms, so as to make them stronger and more durable in construction and more convenient in use.

SCHOOL DESK.—John Mealey, Fairville, St. John, N. B.—This invention has for its object to furnish an improved desk, designed for use in school rooms, lecture rooms, public halls, etc., which shall be simple in construction, strong, and durable, and which shall be convenient for use, being easily adjusted for use as a desk, table, or seat simply, as the occasion may require.

STITCHING HORSE.—Thomas Depp, San Marcos, Texas.—This invention has for its object to improve the construction of the stitching horses used by harness makers, saddlers, etc., so as to make them more convenient and satisfactory in use.

SOLDERING GALVANIZED IRON.—Patrick B. Bonner, New York city.—This invention has for its object to improve the manner of soldering galvanized iron, so that the solder may not crack or break off, and will make the seam perfectly tight.

SPRING.—Frederick Cajar, New York city.—This invention consists in constructing the springs of corrugated metal and arranging the plates or strips so as to take the strain in the direction of the breadth of the same.

COMPOUND FOR PROMOTING THE GROWTH OF THE HAIR.—Benjamin F. Atwood, New York city.—The object of this invention is to provide a vegetable hair dressing, which will strengthen the hair and promote its healthy growth. It has been found by ample practical test to promote the growth of hair where the the same has been lost from fever, and in other cases where the hair follicles are not completely closed.

ARTIFICIAL LIMB.—Geo. B. Head, Albany, N. Y.—This invention consists in the construction and arrangement of the parts by which the necessary movements are produced, but relating more particularly to the method of operating the knee joint.

BIT STOCK.—George Richards, Richland Center, Wis.—The object of this invention is to provide a brace or bit stock the handle of which is extensible, for obtaining more leverage when the resistance requires it. This is accomplished by forming the stock in three separate pieces and uniting them in such a manner that the grasp or handle can be extended at will.

APPARATUS FOR TOLLING GRAIN.—Wm. S. Widger and Wm. M. Read, Fairfield, Iowa.—This invention consists of a rotating funnel provided with a spout that may be adjusted to the same fractional portion of the surface of the mouth of the funnel as the fractional part of the grain to be taken, which is arranged so that the grain must pass through it while it is in rotary motion, whereby an amount of grain equal to the fractional proportion of the spout to the funnel is diverted from the main portion and turned into a separate channel.

TRAMS FOR GAGING MILLSTONES.—Thomas R. James, St. Louis, Mo.—The nature of this invention relates to improvements in apparatus for traming or gaging the faces of the upper or running stones of grinding mills, and it consists in providing a tram brush which may be secured to the stone by the ends of the same being wedged into the recesses provided for the driver having a central opening through it vertically, provided with set screws wherein a shaft may be set with its lower end resting in the socket on the bail of the stone, whereby the said shaft may be nicely adjusted to a position exactly perpendicular to the face of the stone. On the upper portion of the said shaft may be arranged a swinging arm which is provided with one or more gage points.

STATION INDICATORS FOR RAILWAYS.—Elihu Spencer, Ottawa, Canada.—This invention relates to certain new and useful improvements in station indicators for railways, which improvements are more especially applicable to an implement for the above purpose, which was patented by the present inventor December 21, 1867.

LOCOMOTIVE SMOKE-STACK.—J. A. W. Justi, Savannah, Ga.—The object of this invention is to provide a locomotive smoke-stack with such detaining devices that no coal, cinders, nor sparks, can pass through, and with the escaping smoke, while the draft is not in the least impeded.

GRIST MILL.—Bennet Whitney, New Brunswick, N. J.—The object of this invention is to so construct a grist mill that the upper stone will be allowed to swing in either direction, and can at the same time be adjusted up and down; that no meal can escape through an upper opening in the curb; that the whole mechanism can be easily taken apart, without disturbing the bottom of the curb, and that the hopper and its shoe can be arranged on either side of the mill, as may be desired.

ELASTIC ROLLER.—Allen Magowan, Boston, Mass.—The object of this invention is to produce a roller for wringers and other machinery, on which the elastic will not slip on the mandrel, and which will be also durable and soft. The invention consists chiefly in forming an elastic core, by dipping a string into liquid raw india-rubber, and in then winding the string thus saturated around the mandrel. Thus a strong elastic core is produced, which will not slip on the mandrel, especially if projecting arms are formed on the mandrel. The invention also consists in the use of longitudinal tubing for winding the roller on a square handmill.

GRAIN CLEANER.—John E. Anderson, Boiling Springs, Pa.—The object of this machine is to accomplish the cleaning of grain in the most effective and perfect manner, and with the fewest and simplest arrangement of parts. It consists, in general terms, of a scouring wheel, revolving with high speed encountering the entering grain, and agitating it, thereby thoroughly loosening it from the chess, and cockle, and chaff. The grain is then delivered from this wheel, upon an inclined screen, when it encounters a blast of air from a revolving fan wheel or blower, located within the general frame of the machine, and immediately below the scouring wheel. The screen is not the plane surface heretofore used, but is corrugated in the form of steps running crosswise to the direction of the blast from the fan wheel, so that the kernels of cleaned grain will catch against the corrugations, and be retained from being blown out with the chaff.

LOOM.—A. W. Silvis, Birmingham, Iowa.—This invention relates to improvements in hand or power looms for weaving cloth, and it consists, first, in an improved automatic picker motion; second, in an improved arrangement of harness operating mechanism; and, third, in an automatic take up apparatus, whereby a very nearly uniform tension is maintained on the cloth by means of a weighted take up lever, which is operated by the lay.

TRACE FASTENING.—F. W. Dean, Tremont, Ill.—The object of this invention is to provide a simple, efficient, and easily operated trace fastening. It consists of a link hinged to the single tree in such a manner that it will hold the trace from slipping off from the pin in the end of the single tree, and may also be moved away from the pin when the trace is to be slipped over the pin.

CARDING MACHINE.—Charles F. Morrison, Rifton Glen, N. Y.—This invention consists in providing carriers to receive the waste that falls from the feeding rolls, main card, and doffer, and carry it to a stripping roller, whereby it is returned to the carding rollers again and reworked.

HAMMER HATCHET.—T. S. Coffin, Harrington, Maine.—The object of this invention is to provide a simple and convenient tool. It consists of a hammer having short claws, and a socket extension, all of one continuous piece of metal, in combination with a hatchet blade fitted to screw into the upper part of the chamber in rear of the claws. By this construction the hatchet blade is removable at will, or may be turned at right angles to its usual position, to enable the claws to catch the head of a closely driven nail.

FILTER AND HEATER.—R. R. Fenner, Urbana, Ill.—This invention consists in placing within the heater pieces of cast iron, by the presence of which in the heater the lime, which is in a fluid state, will at a certain degree of heat become crystallized and adhere to the pieces of iron to a great extent. The heated water is then passed through a filter which separates the balance of the lime.

COMPOSITION FOR BURIAL CASES.—J. R. Hathaway, Westfield, N. Y.—This invention relates to improvements in burial cases, and consists of an improved composition of matter for constructing the same either wholly or in part, or for ornamenting the same.

MACHINE FOR TWISTING JACK BANDS.—J. Collier, Morenci, Mich.—This invention consists of an arrangement of rotating hooks and a stationary hook for twisting the yarn, which are automatically thrown out of gear when the yarn has been sufficiently twisted; also a yielding twisting hook to which the yarns are transferred from the stationary hook to be finally twisted together.

TWEER.—O. G. Newton, Edinburg, Mo.—This invention consists of a ball valve, provided with cavities to receive the cinder, arranged on a rotating shaft having a vertically-adjustable bearing whereby it can be raised and lowered to be rotated for the discharge of the cinder, and also for regulating the passage of air to the fire.

PEACH BASKET.—Henry Carpenter, Brooklyn, E. D., N. Y.—This invention consists in a novel manner of securing the bottom in the basket.

CURTAIN FASTENING FOR CARRIAGES.—Ephraim Shepard, New York city.—This invention relates to a new and improved curtain fastening for carriages, whereby a curtain may be readily fastened and unfastened, and be firmly secured in position when in a fastened state.

SULKY CULTIVATOR.—P. H. Totten, Adams, Ill.—This invention relates to a new and improved sulky cultivator for cultivating crops grown in hills or drills.

STIRRUP.—John Bond, Versailles, Ill. The object of this invention is to provide an improved stirrup with an oscillating bottom that shall be more agreeable to the rider, and which will, in case the rider is thrown from the horse, readily open and disengage his feet. It also consists in providing a swinging foot piece so connected to the pendant straps as to become disconnected when by any cause they are spread outward sufficiently, and for which purpose they are made sufficiently flexible.

WATER HEATING APPARATUS.—J. C. Ryan, Chicago, Ill.—The object of this invention is to provide an apparatus for heating water and circulating the same to obtain the greatest amount of steam heat or hot water from the fire of an ordinary stove. It is designed more particularly for shop and household use, though it is equally applicable in situations where it is desirable to economize fuel and utilize the heat of one stove for warming other parts of the building.

HAY ELEVATOR.—F. A. Crane, Zanesville, Ohio.—The object of this invention is to facilitate the operation of lifting hay from the wagon and discharging it into the hay mow of a barn. It also consists of a plank or board provided with internal rails affixed on each side of the lower edge of the said plank, and on which a hanging truck and its accessory apparatus travels to and fro. The hanging truck is provided with pulleys and rollers, and a catch lever, the latter being so arranged with reference to the accessory parts of the apparatus, that the truck will be held stationary until the hay is lifted to the proper hight, when the catch lever will be lifted, and the truck with its suspended load of hay will be free to be drawn along the rails to a position over the hay mow into which the hay is to be discharged from the fork.

BEE HIVE.—Benjamin Leckrone, Somerset, Ohio.—This invention relates to several improvements in the construction of bee hives, whereby the entrance of the bees to, and their movements and operations in the hives, can be perfectly regulated and controlled; and whereby the hive can be more conveniently handled, and will be better adapted to secure the health and comfort of the bees, than any hitherto in use.

HOT BLAST FURNACES.—P. and R. Hoop, Berlin Cross Roads, Ohio.—This invention consists in passing the blast of air to be heated for fanning the flame of a puddling furnace through a series of hollow rings placed one above another, in a chimney, the products of combustion beneath rising through the rings and the blast circulating in the rings one after another, said rings being connected by means of pipes for the transmission of the air current from one to another, which pipes pass outside of the chimney, and are arranged to be removed and replaced at pleasure.

HORSE HAY RAKE.—Solomon C. Brinser, Middletown, Pa.—This invention consists in locking the head of a horse hay rake by means of a simple toggle arrangement, in such a manner that it cannot rotate to any degree upon its bearings, but is compelled to bear the teeth steadily forward without change of elevation, as in raking over even ground; also, in converting the before-mentioned locking mechanism into an arrangement of parts for tripping the rake head to avoid stones or the roughness of uneven surface, said tripping arrangement being operated by means either of a hand or foot lever.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisemets at $1 00 a line, under the head of "Business and Personal."

☞ *All reference to back numbers should be by volume and page.*

J. M. C., of Pa.—Your suggestion about the use of a current of water passing through a tube to assist in propelling a boat is very old.

H. F. R.—We know of no good cement that will resist water, and which is adapted to join glass and wood, that is at the same time elastic to any extent.

J. N., of Ala.—In our opinion the statement that common salt put into a kerosene lamp, will prevent the explosions which often take place in the use of bad oil, is incorrect.

J. R., of Mo.—We advise you to send for Henry Carey Baird's catalogue, of which we give a notice this week. By an examination of the contents of the books as therein described you will be able to make a judicious selection of the books you need.

R. M., of Mo.—The star you see is called Aldebaran. It is in the constellation Taurus—the bull. It forms the eye of the bull as pictured on astronomical maps. It is a star, not a planet. The glass of which you speak will not probably enable you to see the rings of Saturn much less his satellites. You can, however, see interesting objects on the moon's surface with it and also the moons of Jupiter

J. M. D., of Mass.—"Why will a small dry needle float on the surface of water?" Water although a liquid still has a certain amount of cohesive force. This force is sufficient to prevent the breaking of the surface by the weight of a small needle provided it be dry and laid very carefully upon the water. "Why will smoke from a locomotive form rings as it issues from the smoke stack in damp weather?" The dampness of the weather has nothing to do with it except that there is apt to be less wind in damp weather than in dry, and the smoke is more apparent. Gaseous volumes puffed suddenly from the mouth of a tube often assume the form of rings, common examples of which are the smoke from a cannon in a still morning, or the rings of tobacco smoke projected from the mouth held in a proper manner.

A. B., of St. Petersburg, Russia, sends us a paper on boiler explosions combating one of the theories of Mr. Norman Wiard—that of unequal temperature.—For a native Russian the letter, written in English, is very creditable, but the ideas advanced are neither new nor useful: they have been more than once published in our columns.

B. C., of S. C.—Your theory of belts is valueless. Belts cannot, in any way increase power. They are only the transmitters of power, and as such, standing between the source and the result, necessary evils.

J. P. G., of R. I.—The amount of surface of a pulley embraced by a belt is not an essential element of calculation in estimating the amount of power it may transmit. A belt that merely impinges upon a pulley *may* be as effective as though it came in contact with two thirds of its circumferential surface.

W. M. L., of Mass., asks if a thread of a pitch eight to the inch would be too "heavy" for a three quarter inch shaft. If he means a bolt to resist a strain or for securing two portions of a structure, such a grade would undoubtedly detract from its strength; but it might be used in some cases, as for a worm or a feed. A three quarter inch bolt should not receive a heavier thread than ten to the inch. See articles in back numbers of the SCIENTIFIC AMERICAN relative to the American system of bolts and nuts.

B. F., of Tenn.—Stone drills should not be finished by the file before hardening. We know it is a common practice, and that cold chisels are sometimes so prepared. The practice is, in either case, not to be recommended. The grindstone is the proper tool for the purpose.

S. F. M.—Yellow rays have so actinic effect upon sensitive plates; hence photographers use deep yellow glass through which to admit light into their operating rooms. Glass is the best material for the sensitizing bath.

T. D., of N. J.—The buoyancy of your immersed buckets is the same whether open or closed; their position has nothing whatever to do with the force with which they seek the surface.

W. J., of Nebraska.—No experiments yet tried give data for an answer to your query. An experiment made with a special view to determining it would be of value. You can easily try it for yourself, and we should be glad to learn the result.

W. W., of Ohio.—The substances used for rendering clothing water-proof, are either ordinary oil paint, or varnish, very liable to crack, or what is much better, india-rubber dissolved in benzine. For this purpose pure rubber is required. Some other processes are used, but would not be available to you, as they are either kept a secret, or are expensive

J. D. C., of Mo.—"Can the bearing of a shaft of wrought iron 5⅛ inches in diameter, if found to be turned slightly too small, be made a good fit by heating it in a common blacksmith's fire and allowing it to cool? Second, Can a locomotive driving wheel be pulled on tight enough before the tire is on with an inch and one eighth bolt and a 3½ foot wrench, supposing the taper to one sixty-fourth of inch." Answer to both questions No.

NEW PUBLICATIONS.

GENERAL PROBLEMS OF LINEAR PERSPECTIVE OF FORM, SHADOW, AND REFLECTION. By S. Edward Warren, C. E. John Wiley & Son, No. 2 Clinton Hall, Astor Place, New York city.

We have before had occasion to refer to the publications of Mr. Warren, and his abilities as an instructor, and always favorably. His published opinions are received throughout the country as decisive, and his books are the text books of the student who desires to become acquainted practically with the principles of the science and the practice of the art of geometry. In this, his latest volume, Mr. Warren has fully sustained the characteristics of his former publications and laid our students under additional obligations. Whatever he does, either as an instructor or writer, he does well, and he has already made his name the synonym for exactness, as his labors as a teacher have made him successful.

THE TROTTING HORSE OF AMERICA; How to Train and Drive Him. By Hiram Woodruff. Edited by Chas. J. Foster, of *Wilkes' Spirit*. J. B. Ford & Co., Printing House Square, New York city.

All who ever drove or owned a horse, or witnessed a trial of speed with any gratification whatever, will be interested in the book whose title we have given above. To Robert Bonner, we are told in the dedication, belongs the credit of instigating the preparation of the papers which form the body of the book, the reminiscences of Mr. Hiram Woodruff, whose opinion on horses is received as authority the world over. Mr. Bonner has offered another proof of his interest in that noble animal, the horse, beside his purchase of the fastest trotter in the world, by his suggestion of this collection of Woodruff's instructions and reminiscences. A very life-like and correct vignette of the great horse trainer embellishes the volume. All who are interested in horse flesh should procure this book.

CATALOGUE OF PRACTICAL AND SCIENTIFIC BOOKS, Published by Henry Carey Baird, Industrial Publisher, No. 406 Walnut street, Philadelphia.

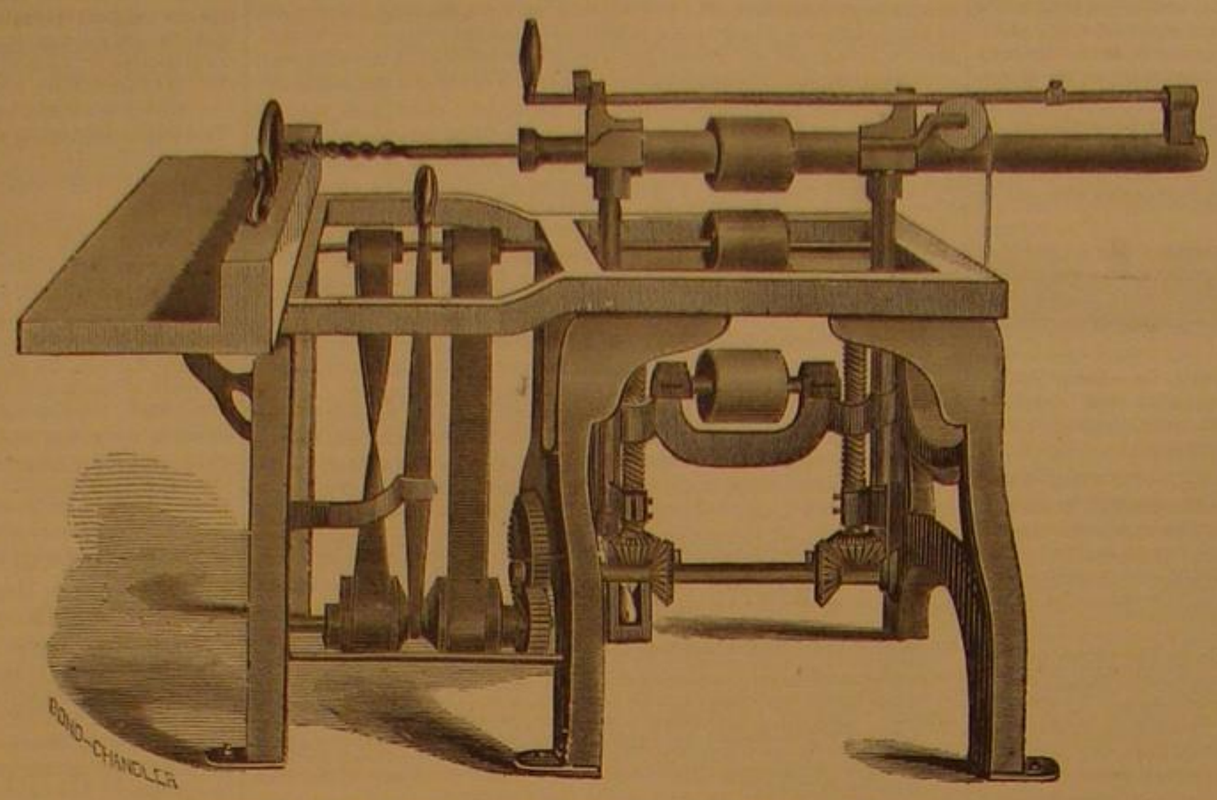
In this catalogue over one hundred and eighty different departments of science and the arts are represented. Mr. Henry Carey Baird is probably most extensive publisher of such books in the United States, and his catalogue will be of value to all such as seek a guide for the selection of books adapted to their special wants, either as manufacturers, engineers, inventors, or mechanics. The publication of the contents of each book enumerated in the list will enable any one to judge of its value. The catalogue is sent free of postage upon application.

Business and Personal.

The charge for insertion under this head is one dollar a line. If the Notices exceed four lines, an extra charge will be made.

Improvement in Machines for Boring by Power.

Boring in wood by power and gaging the depth of the hole bored, the direction and speed of the auger, are not new. Many machines for this purpose have been contrived, and some of them are still in use. They are, however, either too complicated or too little to be relied upon for exactness of work to come generally into use. The table on which the work is laid is not stationary, but must be moved up and down to meet the position of the fixed bit, and in time its bearings wear so that it is no longer reliable. The adaptation of the relative hight of the auger and the stock worked upon is very important. This is one of the objects of the machine the accompanying engraving represents. The manufacturers claim that it will do more than double the amount of work that any other machine now in use can do in the same time, for the reason that the machine is self-regulating by means of a small lever, that the workman can move without changing his position at the machine; the boring bar can be moved up or down to any required point instantly, instead of raising and lowering the table, as by other machines, and that by hand; the workman has nothing to do but put the timber on the table and shift it to the different points, and the machine does the work.



HOIT'S PATENT HORIZONTAL BORING MACHINE.

Another great advantage over other machines is in end boring, such as for joint bolts and truss rods in car frames, or any angular boring. Place the timber in any required position, and it remains stationary until finished. The machine is so arranged that any length of auger can be used, from twenty-two inches down to the shortest size. The accuracy of the machine will be at once seen, for the table or bed is made stationary, and is perfectly parallel with the boring bar, consequently it must always bore correctly.

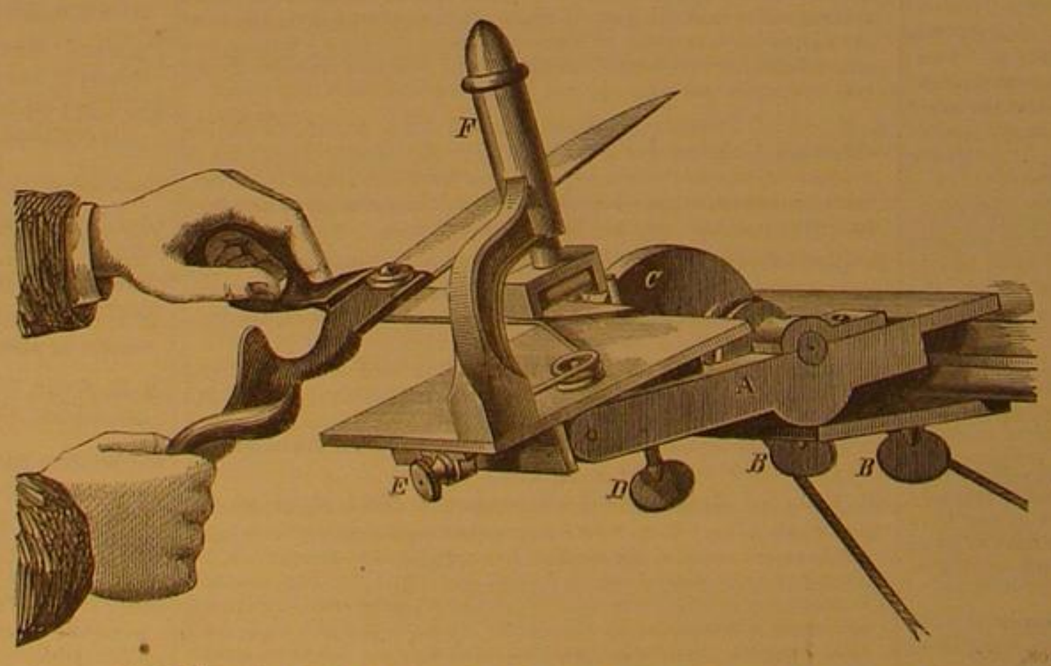
It is also arranged so that the auger is held close to the timber, so that it can be seen exactly when the boring bar is set at its proper hight. The boring bar is moved up and down by means of a friction clutch, consequently as soon as the pressure is let off the lever, the motion stops; and it is also so arranged that it is self-supporting, and will not move up or down unless the lever is applied.

The machine is adapted to all kinds of work, but more particularly to railroad car building and agricultural works. It is well and substantially made, and not liable to get out of order, and is simple and easy to manage.

The machines are built by Hawkins & James, 193 Water street, Chicago, Ill., to whom all letters should be addressed. They are in use by a number of the railroad companies in the country who manufacture cars, and by many other concerns that construct work demanding the employment of the auger.

Improved Device for Sharpening Shears, etc.

A cheap, and generally adaptable contrivance for the sharpening of tailors' shears, seamstresses' scissors, and for the convenience of hotel-keepers, householders, and others, is needed. In cities, they have the unreliable and periodic assistance of traveling grinders, who care nothing for the annoyance they may cause, but receive their payment for a job half done, and know that there all pecuniary or business responsibility on their part ends. The sharpening of a blade of scissors, or of a carving or pocket knife, is not altogether a mechanical process, but requires judgment in regard to the angle presented to the stone, the speed of the stone, and the degree of pressure required to properly present the surface of the steel, and not too rapidly abrade the grinding surface. These may be possibly attained by automatic devices, and the contrivance shown in the accompanying engraving seems to very nearly approach the desired end.



MORSE & COLLINS' PATENT SHEARS SHARPENER.

A, in the engraving, is a jointed frame, suitable to be attached to a sewing or other table by the set screws, B. C is a grinding wheel, either of stone or vulcanite. A gage table, calculated to be elevated or depressed to any angle by the set screw, D, is pivoted to the frame, A, and is moved forward or backward by the screw, E. A spiral spring in the upright hollow sheath, F, holds a roller down on the blade, while a coiled horizontal spring on the gage table presses against the back of the blade of the shears or knife, and holds it to the grinding surface, and two upright roller guides on either side of the wheel regulate the impinging of the blade against the wheel. In operation it will be seen that the device may be attached to a sewing machine and driven by the belt that drives the machine; or it may be used separately as an independent machine to be employed by tailors, hotel keepers, householders, and others, and driven by foot power. The blade can be held to the stone in both directions by means of the roller and spring, and adjusted to any angle by the elevation or depression of the gage table by means of the set screw, D. For tailors' use the value of this device is manifest, as it will enable a country tailor to sharpen his shears without the expenditure of time and money now so necessary for the purpose. It is equally well adapted to sharpening knives for harness makers, market men, and others, as the amount of bevel and of pressure against the grinding surface is entirely controllable.

Patented June 23, 1868, by Melvin M. Morse, and M. V. Collins, Buffalo, N.Y. All communications concerning rights and the patent should be addressed to M.V. Collins, Sherman, Chautauque County, N.Y.

To Detect Common Air in Coal Gas.

Ten parts by weight of anhydrous sulphate of protoxide of manganese are put into a two necked Woulf bottle, and then therein dissolved in twenty parts of warm water. To this mixture is immediately added a solution of ten parts by weight of tartrate of potassa and soda (Rochelle salt), dissolved in sixty parts of water; the thorough mixing of the fluids is promoted by well shaking of the bottle, after this there is added a quantity of a solution of caustic potash sufficient to render the fluid quite clear; immediatety after this the corks, perforated of course and fitted with very tightly fitting glass tubes, are placed in the necks of the bottle, which should be entirely filled with the mixed fluid just alluded to. One of the glass tubes—the inlet tube for the gas to be tested—should just dip a little under the upper level of the fluid; the outlet tube, on the other hand, should only reach half way the perforation of the cork. A very slow current of gas is now made to pass through the fluid, and kept going for at least a quarter and at most one full hour. In case the gas is quite free from atmospheric air, the fluid in the bottle will remain quite clear; if traces even of air are present, a faint coloration of the liquid will soon become apparent; with a larger proportion of air present in the gas the fluid will soon be rendered first light brown colored, and afterwards intensely black. Since these changes of color are due to the oxidation of the salt of manganese, it is evident that every care must be taken to avoid the presence or access of accidental air; the fluid in the Woulf bottle should reach the cork. It is best to cool the bottle during the experiment with ice, if at hand, otherwise with very cold water; the current of gas must be slow.

Mortar---Dr. Artus' Method.

We condense from the *Iron Age* an account of a method of preparing mortar, which gives promise of superiority over the methods now in use:

"It is well known that the mortar used by the Romans made far more durable masonry than modern mortar. The modern mortar hardens very slowly, tears after hardening, does not become very firm, crumbles easily after a considerable period has elapsed, and does not unite well with the building material, so that after thoroughly hardening, there is but little difficulty in removing single stones from the top layers of masonry. In investigating the mortar of old Roman masonry, it was discovered that the mortar had for the greater part been converted into silicates, which had entered into very close union with the quartz particles. It is well known that with modern mortar the formation of silicates does not take place until after a long time, and then only in a very slight measure. But it is just these silicates which give mortar firmness, and at the same time make it capable of resisting the action of water. It is to the formation of such silicates that cement owes its hardness and imperviousness to water. Lately, Prof. Artus discovered a method of preparing mortar by which the silicious earth is, according to the chemical term, set free and the formation of silicates greatly promoted. The mortar prepared after this method hardens much more rapidly than common mortar, attains equal hardness with cement, and forms no tears while drying. It may also be accepted that it can be used under water in the place of cement. Still, until now, only experiments, in which the Artus mortar has proved its excellence as air mortar, have been reported to us, while of its utility in the place of cement under water no confirmatory experiments have as yet been made known to us.

"The method employed by Dr. Artus is extremely simple. Take well slacked lime, and mix carefully with it finely sifted sand; when this has been done let there yet be added one quarter as much fine unslacked lime as there has been sand used, and mix thoroughly. While it is being mixed the mass heats and the mortar may then be immediately used. Of course the unslacked lime must not be added to the mass until it is wanted for use. During the heating of the mass silicates form through which it quickly stiffens and becomes very hard in a short time. This mortar forms no tears. It resists all action of the water, and can therefore be used whenever durability is an object. This mortar clings so firmly that after a short time even considerable force has to be used to separate it from the building material. Experiments made with it have yielded brilliant results, so that the writer may believe to have solved the former so-called mortar secret. This is what Dr. Artus writes in his quarterly periodical. An experiment known to us, yielded the following result: One part of well slacked lime was carefully mixed with three parts of fine sand, and just before using, three quarter part of fine unslacked lime was added, and the whole then thoroughly mixed. The mortar thus prepared was used in building a foundation wall, and after four days became so hard that a pointed iron could not be driven into it; it clung with equal tenaciousness to the stones of the wall. After two months the mortar was just as hard as stone. We have then, here, a very valuable discovery under consideration, which must also be of great account from an economical point of view, when the high price of cement is remembered."

It seems that experiment has not yet shown how long the mortar may be used after preparation or what quantities may be prepared at once; important practical details which we trust will be found to form no obstacle to the adoption of the method. We hope the process will be practically tested in this country and we would be glad to receive accounts of the results reached, from any who see fit to give it a trial.

A Singular Criminal Case.

Sometime since, considerable excitement prevailed in this city about the exhibition of a pseudo headless rooster, which was represented to be living, although its head had been chopped off for weeks. Of course none but the ignorant believed the statement, but the means by which deception was accomplished have recently come to light. One Henry Richardson has been arrested and held to answer upon a charge of cruelty to a rooster by cutting off its bill or beak, piercing out and destroying both eyes, taking a portion of its brain out, pulling the feathers from its head and neck and then skinning the same, after which the skin was so drawn up as to make the said rooster appear headless.

The testimony taken shows that the prisoner had practiced this cruelty for a considerable time, and that the fowls would live after the operation several weeks. Richardson pleaded not guilty to the charge, but was bound over to answer. If guilty, we earnestly hope he may be convicted, and we suggest that an appropriate punishment would be to serve him as he served the roosters.

A SOCIETY has been formed in Paris to oppose the use of tobacco. Each member pledges himself to abstain, and to use his efforts to induce others to abstain, from tobacco in all forms. The society already numbers twelve hundred members.

SOME enterprising speculators have made a bid for all the old paving stones and gas lamps of Paris to be shipped to Monte Video and Buenos Ayres, to beautify the streets of those cities.

Scientific American.

MUNN & COMPANY, Editors and Proprietors.

PUBLISHED WEEKLY AT
NO. 37 PARK ROW (PARK BUILDING), NEW YORK.

O. D. MUNN. S. H. WALES. A. E. BEACH.

☞ "The American News Company," Agents, 121 Nassau street, New York.
☞ "The New York News Company," 8 Spruce street.
☞ A. Asher & Co., 20 Unter den Linden, Berlin, are Agents for the German States.
☞ Trubner & Co., 60 Paternoster Row London, are also Agents to receive subscriptions.
☞ Messrs. Sampson, Low, Son & Marston, Booksellers, Crown Building 188 Fleet street, London, are the Agents to receive European subscriptions or advertisements for the SCIENTIFIC AMERICAN. Orders sent to them will be promptly attended to.

VOL. XIX., No. 20...[NEW SERIES.]....*Twenty-third Year.*

NEW YORK, WEDNESDAY, NOVEMBER 11, 1868.

Contents:

(Illustrated articles are marked with an asterisk.)

CAVEATS.

Whenever an inventor is engaged in working out a new improvement, and is fearful that some other party may get ahead of him in applying for a patent, it is desirable, under such circumstances, to file a caveat, which is good for one year, and during that time will operate to prevent the issue of a patent to other parties. The nature of a caveat is fully explained in our pamphlet, which we mail free of charge.

EUROPEAN PATENTS.

More than three-fourths of all the patents taken by American citizens in Europe have been secured through the Scientific American Patent Agency. Inventors should be careful to put their cases in the hands of responsible agents, as in England for example, the first introducer can take the patent and the rightful inventor has no remedy. We have recently issued a new edition of our Synopsis of European Patent Laws.

COMPARISON AND RELATION THE ONLY CRITERION OF SIZE.

The "mechanical eye," so valuable in mechanical operations, is educated wholly by the comparison of one object with another; it has no absolute virtue, or power of determining the real dimensions of any object. If it were so there would be small necessity for accurate rules and gages, by which the eye determines any dimensions. Let the most experienced mechanic be shown a piece of say three-quarters inch iron, in connection with other pieces of iron of one inch, and one and a quarter, and of three quarters and less, and he may find no difficulty in determining by his eye the diameter of either one of these pieces, it being considered, of course, that the diameter of some one or more of these pieces are known. Yet let this piece of three-quarters inch iron be shown in connection with bars of from two inches diameter to six inches, and it would puzzle the most educated eye to determine whether the three quarter inch iron was of that size or whether it was seven-eighths or eleven-sixteenths of an inch in diameter. The reason is that the eye is insensibly misled or diverted from the object to be viewed, or rather is so occupied by the surroundings that an accurate estimate is impossible.

So distance, as all know, interferes with the exact action of the educated eye. No two mechanics, however skillful, will agree, for instance, on the exact size of a cross on a church steeple. Why? because there is no object near by which the relative hight or size of the cross may be gaged.

Yet even when there are means of comparing relative dimensions, it is sometimes difficult to determine size and position. In no case is this seen more plainly than in the work of the proof-reader who wishes to know if a letter is turned. Take the letters S, s, X, Z, and the figures 3 and 8. To the ordinary sight, the lower and upper half of these are identical in form and size; but let the reader reverse them—turn the page upside down—and he will see at once that there is a difference, so great that even the careless reader will be aware of it, although perhaps not able to decide where the discrepancy exists or to point out the remedy. The proof-reader, however, has educated his eye to such a nicety in ascertaining and comparing forms in the relations of contiguous objects that what would escape the notice of others arrests his attention, and he sees at once the trouble without the necessity of reversing the page for the purpose.

There is no fallacy so fallacious, no saying less an axiom, than that one may depend upon the evidence of his senses, especially the one of vision. To use this correctly the eye must be educated, and not only educated, but confined to the observation of a certain set of objects to acquire the skill which is the offspring of discrimination. The astronomer is not a chemist, who can detect the presence of the minutest portion of a foreign element in the substance he examines by the microscope. The sea-going man, used to peering through long distances, would be as much out of his sphere in the watchmaker's shop as a girl would be with the cares of a country on her brain. His eyes are as uneducated to the microscopic niceties of the watchmaker's art, as is the woman's brain to the responsibilities of government.

SELF-EDUCATION.

All men of distinction are self-educated men in one sense. The early possession of what are commonly termed educational "advantages," is of little value unless those who enjoy them have in themselves the elements without which such advantages are worthless. Given these elements and the "advantages" are not indispensable, although valuable. Circumstances have much to do in developing taste for study, which is the common characteristic of all thoroughly educated men. Many a young man who now looks upon the study of books as a dry and irksome task, would, if his attention were fixed upon some subject adapted to his tastes and moderate acquirements, entirely change his views. Without underating the value of proper instruction, the fact that so many men have been able to achieve scientific eminence without it, is sufficient encouragement to such as are perforce deprived of it. To such, and there are not a few among the youth of this country, we offer a few suggestions as to the best course for self-training.

In higher institutions of learning it is usual to say one *reads* Latin or Greek, or mathematics or mechanics, rather than he studies this or the other subject. The word read is here a synonym for study. That is right; to read properly is to study in its highest sense. It is a much more difficult thing to read than most people think. For the most part that which is called reading is mere skimming. It occupies an idle hour by placing a variety of images before the mind in rapid succession, like a kaleidoscope, but like the images of that amusing toy, each is forgotten as a new one is presented; and after all is done nothing remains but a dim recollection of a jumble of colors. Nothing definite, nothing valuable is retained. But, says one, I read for amusement, and so long as I get that, I wish nothing more. To him we reply that our suggestions are not to him, at least until his tastes are radically changed. Only this much we will say to him; he greatly mistakes if he supposes that even the highest degree of amusement is to be obtained in such reading.

We affirm that when a youth has acquired the power to *read his own language* in the full meaning of the term, he is nine-tenths educated. We care not if he has never looked into a work on mathematics, or conjugated a Greek verb. He may know little or nothing of the sciences, but he has acquired the power to know any thing that any other mind can know, because he has mastered the means by which all knowledge is accessible to him—his mother tongue. Not obtained such a critical knowledge of its etymology as he will obtain by a classical course of reading, or of the niceties of grammatical construction; but mastered it in that he holds the keys that will unlock all the storehouses of learning. He is a mental gymnast who, although he has never attempted to raise the heavy weights of knowledge and science, need have no fear that he will fail in his attempts when he essays it.

Young men who are desirous to educate themselves, should select elementary treatises at first; such as treat of their subjects in a familiar manner. Having thus selected, they should set about reading them with the stern determination, not to let a single page, or line, or word, pass uncomprehended. Geographical names should be properly pronounced and the places they indicate carefully located, not on a map merely, but in the mind. Allusions to men and events should be at once followed by research into the histories of the men and the events themselves. The writer of this article once, upon commencing to peruse a volume found before he had got over the first page, that he must read up two or three biographies, and several other collateral matters before he could go on intelligently. Such occurrences will frequently happen, but the labor involved must not be shirked: if labor at first, it will soon become pleasure.

The habit of fixed attention is also of the utmost importance. A wandering mind is essentially a weak mind. If anything is unworthy attention, renounce it altogether, do not acquire that bad habit of at once half listening, and half pondering, so common and so enervating to mental vigor. Remember always, that *to get* is not so important as the *power* to get. Strive to obtain strength of mind rather than many ill-digested facts. Don't swallow facts whole any more than you would your food. Chew and digest. Overloading is as bad for the mind as for the stomach, therefore avoid cramming. Seek to learn the general principles of science rather than the bare details; the details will come upon application of the principles. Cultivate the habit of closely observing everything you see. Every natural thing is worthy the closest inspection. Works of art and mechanical construction are good studies whether meritorious or otherwise. If good, seek to know the elements of their worth; if bad, criticise their faults. If your tastes incline to any particular field of study, let them run. Don't seek to stop them. You will succeed best in that field. Above all, avoid the pernicious habits of listlessness and day-dreaming, and remember that the chief attribute of genius, if there is anything can be called genius, is the disposition to study anywhere and everywhere, with or without book, to think not hap-hazard, but to think fixedly and connectedly upon what you will. You can study while you are working at a vise, or at the lathe, or pegging a shoe; but it must be thought that is subject to your will; kept within prescribed bounds, or it becomes the day-dreaming which we have cautioned you against.

Lastly, while we do not condemn indiscriminately the reading of works of fiction, we assert that until you have ripened and improved your tastes by a different class of literature, you can not be judges of what is good or bad in fiction; so that if you read such works at all, you should do it under the direction of some one who is competent to advise you what is meritorious and what is to be avoided.

"GOLD! GOLD! HARD TO GET AND HEAVY TO HOLD."

The above line was written at a time when the sources of gold were less numerous than at present, when fewer men were employed in digging it—when the supply was very much less than now. Notwithstanding, gold is harder to get now than in Hood's time, and still harder to keep when got. The reason for the firmness in the price of gold seems to be a universal topic, just now, among papers devoted to finance. Very little light is thrown upon the subject by the essays which we have perused. The fact that the supply has largely increased, is urged to show that present rates are too high. The collateral fact, that gold is used up very slowly, at best, by wear, losses at sea, etc., is also strongly urged to prove that there must be a large increase in the amount of gold in circulation.

The gold fields of California, Australia, Colorado, Idaho, and Montana, have been successively developed during the last twenty years, and have poured an enormous amount of gold into the general current. Since 1850, one billion of dollars' worth of gold has been mined, yet the relative value of gold to other precious metals remains essentially unchanged.

It was predicted, ten years ago, that the price of gold must become permanently depreciated by the large increase in production. To-day that prediction remains unfulfilled; yet to-day the prediction is as confidently reasserted, as it was ten years ago. The quite general distribution of gold, in mountain ranges everywhere, is an admitted fact. At present, it is only profitable to mine for it under circumstances of comparatively little difficulty, so that many large deposits remain unmolested. New deposits are constantly coming to light, so that the supply annually increases rather than diminishes. Accounts reach us of mines of extraordinary richness in Southern Africa. The mines of Italy are just beginning to pay, while the mines of Frontino and Bolivia seem to give specimens of remarkable richness.

Are, then, the predictions of which we have spoken about to be realized? We think not. We believe that, in 1878, gold will be found to have still maintained its relative value, in spite of the large amount that may reasonably be expected to be taken out before that time.

Briefly, our reasons for this opinion are these: First, gold is a commodity as much as iron, and is subject to the same laws of supply and demand. Second, the demand has increased, in the past, and, we are confident, will increase in the future as fast or faster than the supply. The uses of gold in the arts are increasing in number and extent. Compare the number of gold watches, the amount of gold employed in jewelry, dentistry, gilding, bookbinding, etc., with the same, twenty years ago, and it will at once be evident that the demand has increased without resort to statistics. The population of the world is increasing, and, more important still in its effects upon a demand for gold, is the rapid march of civilization, and the consequent spread of a taste for general ornament, in which gold is so largely used.

Here we have elements of increased demand to compensate for increased supply. Those who only think of gold as currency must of course be misled, in their opinions upon this subject. There is probably far more gold in this country to-day applied to ornamental uses than exists in coin. Nearly all above the lowest walks of life have more or less of it upon their persons and in their houses. So long as this is the case, so long as population continues to increase at its present rate, and civilization advances, so long will gold maintain its standard of value, if indeed it does not rise above it.

EXPANSION OF ICE.

A discussion upon the expansion or contraction of ice by the action of cold is exciting much interest in England, both on account of the subject itself, and the high authorities which are parties in the discussion. Prof. Tyndall takes the ground that it expands. Other eminent philosophers dispute the accuracy of the experiment from which Dr. Tyndall draws his conclusions. The experiment is as follows: Around nicely fitted blocks of ice he places bands of cast iron; upon submitting the whole to the action of a freezing mixture the bands soon burst with a loud report. Those who doubt the correctness of Dr. Tyndall's conclusion, argue that the experiment does not prove that ice expands, as the contraction of the iron is sufficient to account for the bursting of the bands. They further confirm their opinions by the fact that the ice which forms upon the surface of the British American Lakes, often to a thickness of several inches during a single cold night, will, upon the recurrence of severe cold, crack open widely. This is thought to indicate contraction instead of expansion. It certainly seems that the experiment of bursting iron rings by refrigeration is not altogether conclusive of the expansion of ice, still although it may be defective, we are inclined to the opinion that ice does expand as the temperature diminishes. If such should be the case, it appears to us that it would easily be deter-

mined by a specific gravity test, weighting the ice with platinum,and using mercury as a means of making the test, that substance remaining fluic at low temperatures, and having no solvent power on ice. It would be easy to make a proper allowance for the increased specific gravity of the mercury as the temperature diminishes.

TRANSPORTATION OF CATTLE---REID'S PATENT CATTLE WAGONS.

Some years since, while we were standing in the depot of the New York Central Railroad, at Amsterdam, awaiting the arrival of an express train from the East, there passed the station two enormous trains from the West, each requiring two locomotives to draw them, and laden with live cattle for the New York market. Live cattle, did we say? We must qualify that statement, for, on either train, there were some dead,others in a dying state,while all were greatly distressed, as was evident by their violent panting and protruding tongues. Some were prostrate under the feet of the rest, powerless to rise. The causes for this state of things was obvious. The weather was intensely hot, and the cattle crowded together as close as they could possibly stand, and not having been allowed to drink since they left Buffalo,were dying of thirst. We remarked, at the time, that it seemed an easy task to provide water for cattle thus transported, but a fellow traveler remarked that, were a proper apparatus constructed, no railroad in this country would adopt it unless compelled to do it. We, however, hoped, and still hope, that the greed of railroad corporations will not prevent the universal adoption of any simple method for securing such a humane object.

Our attention has been called to a simple and effective mode of supplying cattle with water while being transported in railway cars, invented by Wm. Reid, of Granton Harbor, near Edinburgh, Scotland, which seems admirably adapted to the purpose. The cars are provided with troughs, to which water can be readily supplied while the trains are stopped for taking in water for the use of the engine.

There is no doubt that many cattle become diseased by confinement without water during transportation, and that their meat, rendered more or less unwholesome by it, is sold and eaten, to the detriment of public health. The knowledge of this fact will do more toward correcting the evil than an appeal to the humanity of individuals. If railroad corporations refuse to correct it, they should be compelled to do so by legislation.

NEW MEXICO, ITS NATURAL WEALTH.

The Honorable W. F. M. Arny, ex-governor of New Mexico, has presented to the geological and mineral museum of the United States Department of Agriculture, a collection of specimens of minerals, fossils agricultural products, etc, from which an idea of the natural resources of that territory may be obtained.

Among these specimens are native copper from the Tijeris mountain, a short distance from Santa Fe; bituminous shale from Placer mountain; iron ore from the San Juan country; brown copper ore from the San Dio range, also but a short distance from Santa Fe; limonite from the vicinity of Placer mountain; purple copper and native copper from the Naciamento mountains; iron pyrites, drusic, quartz, felspathic trachyte, pumice, and trachyte from the San Juan. Indian country; argentiferous galena from Stevenson's mine in Dona Anna county, native copper from Hanover mine near Gila river; marble from near Santa Fe; argentiferous galena from Valencia county; dentritic manganese in felspar paste containing gold. from Placer mountain; gold bearing quartz and native copper from the vicinity of Abiqui, Rio Arriba county; conglomerate containing gold from the Ute creek on Maxwell's ranch stated to be unsurpassed in richness, various grades of wool, corals, and so forth.

Strikng as is this exhibit of mineral wealth, there is little doubt that much remains yet to be discovered. The rapid development of these resources is however interfered with by the depredations of Indians who render mining operations, except in places near centres of white population, extremely hazardous. Governor Arny asserts his belief that the mineral wealth of the mountains of New Mexico would pay twice our national debt, if miners could be permitted to develop it in safety. His opinion is that "is is cheaper to feed than to fight Indians, and that the Indians of New Mexico can all be placed on reservations without a war, if Congress will make sufficient appropriations to feed them, and furnish the necessary machinery to enable them to make their own clothing and establish industrial schools, to be kept up at the expense of the Government till the Indians are made self-sustaining, which, by faithful agents, can be done in a few years."

With these Indians such a plan might prove successful, as they are said to be already partially civilized, but so far as our knowledge of Indian reservations extends they are generally constant bills of expense to the Government; the Indians are not self-sustaining and the agents are far more interested in making money for themselves, than in caring for the trusts imposed upon them. We have always held the opinion that a race who will not become civilized, and who at the same time resist the onward sweep of civilization, must not only be inevitably swept before it to extinction, but that they deserve scarcely more sympathy than the other savage beasts of the forest whose ferocity they not only imitate, but surpass. We believe that although feeding may be cheaper—so far as money goes—than fighting, the only effectual remedy for Indian outrages on our frontiers, is the strong hand. The only way to conquer the American savage is to punish such outrages by almost total extermination of the tribes that perpetrate them. To exhibit mercy to these butchers is to waste powder.

ON A PROBABLE CONNECTION BETWEEN THE RESISTANCE OF SHIPS AND THEIR MEAN DEPTH OF IMMERSION.

By W. J. MACQUORN RANKINE, C.E., LL D., F.R.S.

1. It was pointed out some time ago, that when a wave in water is raised by a floating solid body which is propelled at a speed greater than the natural speed of the wave, the ridge of the wave assumes an oblique position, and the wave advances obliquely; so that while it travels at its own natural speed in a direction perpendicular to its ridge line, it at the same time accompanies the motion of the solid body at a greater speed. The angle of obliquity of the advance of the wave is such that its cosine is the ratio of the natural speed of the wave to the speed of the solid body. It was at the same time pointed out that under those circumstances there is an additional breadth of wave raised in each second, expressed by the product of the speed of the solid body into the sine of the obliquity; or, in other words, by the third side of a right-angled triangle, of which the speed of the solid body is the hypothenuse, and the natural speed of the wave the base; that in raising that additional breadth of wave per second, energy is expended; and thus that a rapidly increasing additional term is introduced into the resistance to the motion of the solid body, so soon as its speed exceeds the natural speed of the waves which it raises.

2. The waves taken into account in Mr. Scott Russell's theory of the resistance of ships, are waves whose speed depends on their length alone; and that theory accounts for a rapid increase in the resistance of a ship, when her speed exceeds the natural speed of certain waves of lengths depending on her length.

3. In a paper read to the Royal Society in May, 1868, it was shown that for all waves whatsoever, there is a relation between the natural speed and the virtual depth of uniform disturbance, that is to say, the surface particles would have to extend in order to make a total volume of disturbance of the water equal to the actual volume of disturbance. That relation is, that the speed of advance of the wave is that due to a fall of half the virtual depth. In a paper read to the Institution of Naval Architects in 1868, it was pointed out that every ship is probably accompanied by waves, whose natural speed depends on the virtual depth to which she disturbs the water, and that, consequently, when the speed of the ship exceeds that natural speed, there is probably an additional term in the resistance depending on such excess.

4. The object of the present paper is to call the attention of the British Association, and especially of the committee on Steamship Performance, to the probable existence of this hitherto neglected element in the resistance of ships; and to suggest that suitable observations and calculations should be made in order to discover its amount and its laws. Among observations which would be serviceable for that purpose may be mentioned the measurement of the angles of divergence of the wave ridges raised by various vessels at given speeds, and the determination of the figures of those ridges which are well known to be curved; and among results of calculation the mean depth of immersion, as found by dividing the volume of displacement by the area of the plane of flotation; and that not only for the whole ship, but for her fore and after bodies separately, for it is probable that the virtual depth of uniform distutbance, if not equal to the mean depth of immersion, is connected with it by some definite relation.

Results of Observations.—In an appendix are given the results of the only three observations which I have hitherto found it practicable to make, of the speed of advance of the obliquely diverging waves raised by ships. The waves in each case were those which follow the stern of the vessel; the vessels were all paddle steamers, but care was taken to observe the positions of the wave ridges where they were beyond the influence of the paddle race. The virtual depth corresponding to the speed of advance of those waves is calculated in each case, and it is found to agree very nearly with the mean depth of immersion. It is to be observed, however, that the mean depth of immersion of one vessel only, viz., the *Iona*, has been measured from her plans. For each of the other vessels, a probable value of the mean depth of immersion has been obtained, by assuming that it bears the same proportion nearly to the total draft of water in them as the in the *Iona* That assumption cannot be very far from the truth, for the three vessels belong to the same class of forms, being of shallow draft, and very flat bottomed amidships, but having very fine sharp ends. Few as those observations are, they seem sufficient to prove the existence of waves whose speed of advance depends on the depth to which the vessel disturbs the water. The connection between those waves and the resistance remains as a subject for future investigation.

Glasgow University, 15th August, 1868.

APPENDIX.

1. *Steam Vessel "Iona."*—Speed of vessel at time of observation, 15 knots=25·35 ft. per sec.; angle made by ridges of stern waves with course of vessel, 22½°; sine of that angle, 0·383; product, being velocity of advance of stern waves, 9·71 ft. per sec.; virtual depth corresponding to that velocity $9·71^2 \div 32·2 = 2·93$ ft.; mean depth of immersion of vessel as measured on her plans, 3·18 ft. N. B—The draft of water was 5 ft., so the mean depth of immersion was 0·64 of the draft, nearly.

2. *Granton and Burntisland Ferry Steamer.*—Speed of vessel at time of observation, 10 knots=16·9 ft. per sec; angle made by ridges of stern waves with course of vessel, 45°; sine of that angle, 0·7071; product, being velocity of advance of the stern waves, 11·95 ft. per sec.; virtual depth corresponding to that velocity, $11·95^2 \div 32·2 = 4·44$ ft; draft of water of the vessel, 6·67 ft; probable mean depth of immersion on the supposition that it is 0·64 of the draft, 4·3 ft.

3 *Steam Vessel "Chancellor."*—Speed of vessel at time of observation, 12·64 knots=21·36 ft. per sec.; angle made by ridges of stern waves with course of vessel, 22°; sine of that angle, 0·375; product, being velocity of advance of the stern waves, 8·01 ft. per sec.; virtual depth corresponding to that velocity, $8·01^2 \div 32·2 = 2$ ft.; draft of water of the vessel, 3·5 ft.; probable mean depth of immersion, on the supposition that it is 0·64 of the draft, 2·24 ft.

TABLE OF VIRTUAL DEPTHS CORRESPONDING TO DIFFERENT VELOCITIES OF ADVANCE.

	Velocity of Advance.		Virtual Depth.	
Knots.	Feet per second.	Meters per second.	Feet.	Meters.
1	1·69	0·515	0·09	0·27
2	3·38	1·03	0·35	0·08
3	5·06	1·54	0·80	0·243
4	6·75	2·06	1·41	0·433
5	8·44	2·57	2·21	0·676
6	10·13	3·09	3·18	0·973
7	11·8	3·60	4·33	1·325
8	13·5	4·12	5·66	1·73
9	15·2	4·63	7·16	2·19
10	16·9	5·15	8·84	2·70
11	18·6	5·66	10·7	3·27
12	20·3	6·18	12·7	3·89
13	21·9	6·69	14·9	4·57
14	23·6	7·20	17·3	5·30
15	25·3	7·72	19·9	6·08
16	27·0	8·24	2·6	6·92
17	28·7	8·75	25·6	7·81

—*The London Artizan.*

CHEMICAL NOMENCLATURE.

[Continued from page 50.]

The combination of the different elementary substances takes place by a certain attractive power of their smaller particles (atoms or molecules), which is called chemical affinity. As may be expected *a priori*, it differs greatly in different substances, and even differs in the same two substances when the circumstances are changed. The principal modifying circumstance is heat.

Carbon and oxygen, at the common temperature, have no affinity, that is to say, they will not combine. A piece of carbon may lie for a century in oxygen gas without combination taking place, but when sufficient heat is applied the two substances combine with great energy. However, the amount of heat necessary to cause this combination differs according to the form of carbon used. Thus, lamp-black requires much less heat than charcoal, more heat will be required to ignite coke, more still for anthracite coal, yet more for diamond, and, as regards graphite, we can scarcely produce heat enough to ignite it. The comparative incombustible nature of the last named substance, renders it suitable for crucibles for melting brass and other metals or alloys. All these substances are only carbon in different states, called allotropic conditions.

At the same time that the combustion commences to take place, it develops new heat in abundance heating up the adjacent parts to the temperature required for combination in their turn, and so keeping up the heat to cause the final combustion of any amount of carbon and oxygen present. In the place of carbon, sulphur or any other so-called combustible substance may be suostituted.

Combustion, therefore, is nothing but a chemical combination of a so-called combustible substance (carbon, sulphur, hydrogen, phosphorus, etc.), usually with the oxygen of the atmosphere; all that is required to start it, is a sufficient rise of temperature, and any large conflagration gives a striking illustration of the considerable development of heat, which is the result.

By the combustion of carbon, every six parts thereof will unite with sixteen of oxygen, when plenty of oxygen is present; by a limited supply of this last substance, it will only combine with eight parts; and, as the symbol C stands for six parts of carbon and O for eight of oxygen, the product of this combustion is expressed in the first case by CO_2, in the last by CO; and as the first possesses acid properties it is called carbonic acid, and the last possessing no such properties is called carbonic oxide; the last being the generic name for all combinations with oxygen which possess no acid properties.

The combustion of sulphur has for result, the combination of sixteen parts of sulphur with sixteen of oxygen; formula, SO_2, named sulphurous acid.

Selenium and tellurium combine after the same law and with similar results as sulphur, except that the respective numbers of combination are 40 and 64, respectively with sixteen of oxygen; formulæ, SeO_2 and TeO_2.

The combustion of hydrogen has for result a compound of one part of hydrogen (always by weight) with eight of oxygen, forming water; formula, HO.

The combustion of phosphorus forms phosphoric acid; formula, PO_5, which means thirty-one parts of phosphorus and forty of oxygen.

The combustion of potassium forms potassa; formula, KO, which means thirty-nine parts of the metal and eight of oxygen.

Magnesium burning forms magnesia; formula, MnO, or thirteen parts of magnesium and eight of oxygen.

Zinc burning forms oxide of zinc or zinc white; ZnO containing thirty-two parts of zinc and eight of oxygen.

Of all the substances mentioned above, there is none that has more affinity for oxygen than red hot carbon; for this reason carbon is used as the great reducing agent, and almost any oxidized substance mixed with carbon and heated, will give its oxygen to the carbon, and carbonic acid will be formed. On this principle depends the reduction of iron from its ores, the manufacture of potassium, sodium, etc.; and it shows that also in chemistry the law of the strongest prevails, just as in all nature, not excepting the human race. In savage nations, brute strength only prevails, but among civilized people, the strength of mind and knowledge subdues the mere material brute forces, and illustrates the superiority of mind over matter.

The Great Chaudiere Dam on the Ottawa.

The Ottawa *Times* gives an account of the great Chaudiere dam on the Ottawa river, which was formally opened Oct. 16th. It states that it has been ascertained that for years past the water in the Ottawa during the autumn months has been gradually decreasing in volume, and never before has it been so low as this season. The cause will doubtless remain a mystery until the end of time. In fact so low had the water fallen, that for a time apprehensions were entertained that the great mills and factories at this place would be compelled to shut down in consequence. This would have been almost a calamity, had the necessity for it arisen, as many thousands derive their livelihood from their constant operation. However, human ingenuity came to the rescue, and provided a certain and lasting remedy.

An arrangement had been effected sometime since between the mill-owners here and the Government, that the former might construct a dam in the bed of the river, just above the Chaudiere Falls, for the purpose of raising the water in the rear, with a view to augmenting the supply in the ponds and "flooms" connected with the mills. Then arose the difficulty about drowning the adjacent country on both sides. This was provided against by the removal of an island, in the immediate vicinity of the dam, to low water level, so as to admit of its escape when high. This part of the work has been so managed, that the obstruction caused by the dam in low water will be equaled by its facility for escaping during high water—there being an exact quantity of high water obstruction removed to equal that put in to affect the low.

It was no ordinary undertaking to control the impetuous waters of the great Ottawa, and subject their powers to the manipulation of man—to obey his will, and to be obedient to his wishes and desires; but with all old Ottawa's greatness it has been brought down to usefulness, and compelled to exercise a certain amount of industry before taking its departure for its final home in the bosom of the Atlantic.

The entire length of the dam is nearly 400 feet, built of framed beams strongly bolted, and securely fastened to the solid rock in the bed of the river. Its width at the base is 74 feet and 62 feet at the top, with a secure bed of stone presented to the current. The island which was removed was about two acres in extent, and stood about 5 feet 6 inches above the water level. This furnished 9,000 yards of stone which were used in filling in the dam.

The New Metals.

The Boston *Journal of Chemistry* says:—We presume but comparatively few of our readers have had opportunities of examining the new metals brought to light by spectrum analysis. The two most remarkable, *cæsium* and *rubidium*, are strikingly like the metal potassium; and so greedy are they for oxygen, it is necessary to keep them constantly immersed in pure naphtha. The expense of eliminating these rare and sparsely disseminated metals is so great, their cost is marvelously high. A specimen of rubidium in our possession cost us at the rate of more than seven thousand dollars a pound, or one dollar the grain. These two new alkaline metals were discovered by Bunsen, a few years ago, while experimenting upon some mineral waters with the spectroscope. By no other method of analysis could they have been discovered. In examining the waters, he observed some bright lines he had not seen in any other alkalies which he had investigated. He felt certain that these lines indicated a new metal or metals, just as Adams and Leverrier, from the perturbations of the planet Uranus, were convinced of the existence of Neptune. The amount present in the substance examined could not exceed the one thousandth part of a grain; hence, the quantity held in the water was infinitesimal. To obtain a manageable quantity, Bunsen evaporated forty tuns of the Durkheim Spring water, and from this vast amount obtained of cæsium only 105 grains of the chloride, and of rubidium 135 grains! How few know anything of the magnitude of the labors of chemists engaged in research. Since the discovery of the new metals, in the spring water of Durkheim, they have been found in many other springs, in mica, and other old plutonic silicates; also, in the ashes of beetroot, tobacco, coffee, and grapes. The mineral lepidolite contains considerable rubidium, and most of the specimens in the hands of chemists were obtained from that mineral. We cannot predict for the new alkaline metals any very great practical use in the arts.

The other new and interesting metals which we find in our collection are *lithium*, *thallium*, and *indium*. The first of these is of white color, and fuses at 180°. It is the lightest metal known, being almost as light as cork. Before spectrum analysis was discovered, it was supposed the lithium salts were very rare; but the wonderful spectroscope reveals their presence in almost all waters, in milk, tobacco, and even in human blood. A very strange plant is the tobacco plant. How singular, that atoms of the rarest and most remarkable of all the metals—cæsium, rubidium, and lithium—should be found in this pungent weed! When volatile lithium compounds are heated in flame, they impart to it a most magnificent crimson tinge; nothing in ordinary pyrotechny can compare with it. If one six-thousandth part of a grain of lithium be present in a body, the spectroscope shows it when it is volatilized, or burned.

Sumac.

Considerable inquiry having been recently made for information upon the subject of sumac, the commerce in which seems to be growing in this country, the following from the New York *Mercantile Journal* will be of interest:

"The sumacs belong to the Rhus genus of the order of Anacardiaceæ of plants. Gray, the botanist, makes six varieties of sumac found in America from Virginia northward; namely, the Staghorn sumac, Smooth sumac, Dwarf sumac, Poison sumac, Poison ivy, and the Fragrant sumac. The sumacs have a resinous, milky, acrid sap, and several varieties are poisinous. Several kinds, among which are the most common varieties in this country, namely, the Staghorn and Smooth sumac, contain tannin and yellow coloring matter, and are considerably used for tanning light colored leathers and in dyeing. It is also used in calico printing for producing yellow, grey, or black or brownish yellow, according to the mordant used in the operation. A number of varieties grow in different parts of Europe, which are used for the purposes above specified. The cultivation of this tree for its marketable products has largely increased in some parts of the United States during the past four or five years. The parts of the tree which are gathered are the leaves, the peduncles, young branches, and panicles, of which considerable quantities are exported."

The Richmond *Enquiror* says: "Large quantities are gathered in the counties of Eastern Virginia, and sent to Richmond, Alexandria and Fredericksburg for sale. It is dried and packed in bags, and sells readily for from $1.75 to $2 per 100 pounds. It grows spontaneously, and the crop of next year is improved by breaking off the growth of the present year."

The mordants used in dyeing with this substance are either tin, acetate of iron, or sulphate of zinc. The first gives yellow, the second grey or black, according to strength, and the third brownish yellow.

A Challenge from a Lady.

NEW YORK, Oct. 20, 1868.

Messrs. WHEELER & WILSON, No. 625 Broadway:

Gentlemen:—Referring to the challenge of Mr. Pratt, whose Wheeler & Wilson Sewing Machine has been in use ten years without repairing, I beg to state that I have used my Wheeler & Wilson Sewing Machine, in family sewing, *fourteen years*, without even the most triffling repairs, and it is now in so good condition that I would not exchange it for your latest number (now upward of 350,000). One needle served me more than a year for fine sewing.

Can any one beat this?

Yours truly, Mrs. ANNE WARNER.

Any one who can give a better report than this will be entitled to one of our new tucking gages.

WHEELER & WILSON MANUFACTURING Co.

CHILIAN AGRICULTURAL EXPOSITION.—With reference to the Agricultural Exposition to be opened at Santiago, in Chili, South America, on the 1st of April next—the particulars of which appeared in our issue of the 22d July—we have to state that the Chilian Minister expresses the hope that manufacturers throughout the country are preparing the contributions they intend to exhibit. We learn that liberal and extensive preparations are being made by that Government for the accommodation of all.

OFFICIAL REPORT OF PATENTS AND CLAIMS

Issued by the United States Patent Office.

FOR THE WEEK ENDING OCTOBER 27, 1868.

Reported Officially for the Scientific American.

PATENTS ARE GRANTED FOR SEVENTEEN YEARS, the following being a schedule of fees:—

On filing each caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Reissue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay $500 on application.

☞ *Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to Inventors, may be had gratis by addressing MUNN & CO., Publishers of the Scientific American, New York.*

83,355.—HARVESTER RAKE.—Philip Ammerman, Cynthiana, Ky.

I claim the guide bar, k, and beveled block or cap, t, in combination with rake, A, and endless chain, C, substantially as and for the purpose described.

83,356.—SUGAR PAN DERRICK.—Joseph D. Ayers, East Greensborough, assignor to J. O. Cutter, and William Wallace Goss, Greensborough, Vt.

I claim, 1st, The combination, in a sugar pan derrick, of the guide beams, B B', guide post, G, rotating upright, A, pulley, k, cords, a b, derrick beam, C, drum and crank handle, l, all constructed and operating substantially as shown and described, and for the purpose set forth.

2d, The frame, m m o o, hook rods, h n h h, and braces, q q, with the parts specified in clause first of the claim, all substantially as shown and described, and for the purpose set forth.

83,357.—MANUFACTURE OF PIGMENTS FROM THE SULPHURETS OF ZINC AND LEAD.—Nathan Bartlett, Centerville, N.J., assignor to himself and Franklin Osgood, Richmond County, N. Y.

I claim, 1st, The manufacturing of pigments from the sulphurets of zinc and lead, combined in the manner and by the means substantially as herein described.

2d, Also, the pigment made from the sulphurets of zinc and lead, as a new article of manufacture.

83,358. AUTOMATIC CAR COUPLING.—Wilson Bragg, Connersville, Ind.

I claim the combination of the chain, E, sliding block, C, and coupling pin, F, substantially as and for the purposes specified.

83,359.—HOT AIR REGISTER.—Thomas W. Brown, Reading, Pa.

I claim the improvement of having the sectoral lever fixed directly to the slat journal, when the slats are pivoted to the frame, and to a connection bar having no pivoted connection with the sectoral lever, as set forth, the whole being substantially as described and represented.

83,360.—SPRING.—Frederick Cajar (assignor to himself and James Anderson), New York city.

I claim elliptical or arched springs, made of corrugated sheets or plates, arranged as herein shown and described, substantially as and for the purpose set forth.

83,361. MILL FOR TEMPERING CLAY.—George Carnell, Samuel Williams, and William Ellis, Philadelphia, Pa.

We claim the inverted double rack, H, cast with a cover, h2, and internal web, b3, in combination with saddle, M, and pinion, E, for operating the wheel, B, of a clay mill, in the manner substantially as shown and described.

83,362.—JIG SAW.—Joseph E. Chamberlin, Wilmington, Del.

I claim the circular timber, b, with its vernier plate and index, iron band, d d, sliding head blocks, c c, braces, e e, and saw, s, in combination with the semi-circular ways, y y, carriage, 5, segment, i, pinions, g g, h h, pulley, 6, and their connecting or reciprocating appliances, constructed, arranged, and operating substantially as and for the purposes set forth.

83,363. FOLDING PERAMBULATOR.—Andrew Christian, New York city.

I claim, 1st, Extending the front uprights, D, of a folding perambulator downward, to form supports for the front axle, J, as set forth.

2d, Extending the rear uprights, E, of a folding perambulator upward, to form supports for the handle, I, as set forth.

3d, Constructing the jointed arm supports, H, of a folding perambulator, of two parts, a b, which are pivoted together, as set forth, the narrow part, b, fitting into a groove in the under side of the main part, a, as shown.

83,364.—SEEDING MACHINE.—N. A. Clopton, and John S. Clopton, Fauquier County, Va.

We claim the combination and arrangement of the reciprocating slides, k l, vibrating arms or levers, h, connecting pipes or links, j, pivoted arms, g f, and springs, i, or their equivalents, constructed and operated in the manner substantially as shown and described, and for the purpose set forth.

83,365.—MACHINE FOR EDGING METALS.—William Crossley Chicago, Ill.

I claim the combination of the slotted guide, C C', carriage, B E, clamp A, track, G G, slides, M M, crank screw, and slides, F F, constructed as and for the purpose set forth.

83,366.—DRILL PRESS.—John M. Cullen, and Andrew J. Baird, Pittsburg, Pa.

We claim, not any of the specified parts in severalty, but the improved tool, consisting of the several parts specified, all combined, constructed, and arranged as described.

83,367.—FRUIT JAR.—Edward M. Davis (assignor to Henry M. Collins, Benjamin F. Collins, and Homer Wright), Pittsburg, Pa.

I claim, 1st, The method, substantially as described, of labeling preserve cans and other similar vessels, in the act of sealing the covers of such vessels upon them.

2d, The cover, B, constructed with names radiating from its center, and adapted for use upon a preserve vessel, having an index of a suitable description upon it, substantially as and for the purposes described.

83,368.—ATTACHING STRINGS TO TAGS.—Benjamin L. Dennison, Boston, Mass.

I claim, 1st, The combination of the metallic clasp, a, with the string and label card, substantially as and for the purposes described.

2d, The metallic clasp, a, figs. 2 and 5, constructed so as to operate as a clasp, a needle, and a bar, at the same time, substantially as and for the purposes described.

83,369.—COMBINED HINGE AND FASTENER.—Leonard Felker, Tewkesbury, Mass.

I claim the combination and arrangement of the support, e, with its stem, c, and pintle, d, latches, h and i, and catches, b and b', and wings, f f, with or without the plate, a, when arranged to operate as and for the purpose described and set forth.

83,370.—FEED WATER HEATER FOR STEAM GENERATORS.—R. R. Fenner (assignor to himself and Eli Halberstadt) Urbana, Ill.

I claim the arrangement of the supply pipe, E, exhaust pipe, C, ingress pipe, B, water delivery pipe, G, filter, I, and vessel, A, substantially as herein set forth.

83,371.—SCREW TAP.—Walter K. Foster, Cambridgeport, Mass.

I claim the arrangement of the main and lateral oiling passages, a b, and the groove, d, in one of the ranges, of screw cutters, the whole being substantially as described.

83,372.—PROCESS FOR THE MANUFACTURE OF IODINE.—Jules Fougerat and Lucien A. Tartiere, Quogue, N. Y., assignors to "The Alga Chemical Works," New York city.

We claim, 1st, Filtering the calcinized and boiled mussels, preparatory to their distillation, as set forth.

2d, The application of peroxide of manganese to the making of iodine from mussels, as set forth.

3d, The process herein specified of producing iodine from mussels.

83,373.—SPRING BED BOTTOM.—Thomas J. Gaffney and Charles H. Dunks, Detroit, Mich.

We claim the leather strips, H, in combination with the longitudinal top slats, G, and transverse steel bars, E, whereby the slats are secured to the bars, as herein shown and described.

83,374.—VULCANIZED INDIA-RUBBER BELTING.—Dennis C. Gately, Newtown, Conn., assignor to New York Belting and Packing Company. Antedated October 2, 1868.

I claim, 1st, Belting or banding for driving machinery, composed of paper or other pulped and calendered material, combined with india-rubber or other vulcanizable material, substantially as herein set forth.

2d, The use, in combination with paper or other pulped and calendered material, of a vulcanizable cement, applied either externally as a coating, or both internally, as a cement between several layers of paper, and externally, substantially as and for the purposes set forth.

3d, The vulcanizing of paper belting, with rubber or other material or compound capable of vulcanization, between metal plates or otherwise, as herein indicated, so as to produce a smooth surface on the belts, substantially as set for

83,375.—SPINNING MACHINE.—John Goulding, Worcester, Mass.

I claim, 1st, The combination of the segment cam, k, in two parts, elastic roller, j, brake lever, s, with its pin, n, disk, v, or their equivalents, for giving an intermittent feed to the roving, and so that the quantity of roving given out for each revolution of segment cam, k, can be regulated substantially as set forth.

2d, The segment cam, k, in two parts, elastic roller, j, brake lever, S with its pin, n, disk, v, drum, G, rollers, J I, and spool e, in combination with the twisting tube, K, provided with a staple b', or their equivalents, to produce a counter twist to the roving, substantially as set forth.

3d, The segment cam, k, in two parts, elastic roller, j, brake lever, S, with its pin, n, disk, v, drum, G, roller, J I, spool, e, twisting tube, K with a staple, b', in combination with drawing rollers, c' e' d', flyer, F, spindle, F', bobbin, g', or their equivalents, to produce yarn from roving, substantially as set forth.

4 h, The conical cam, R, or its equivalent, mounted on the traversing shaft, N, in combination with the tappet arm, j', lever, k', sliding wedge, n', chain wheels, T, and chain, l' which support the spindle rails, M', substantially as set forth.

83,376.—BOLT-HEADING MACHINE.—Robert Gracey, Pittsburg, Pa.

I claim, 1st, The weighted lever, F, link, G, and toggle arms, K K, in combination with the header, N, and steam cylinder, A, arranged and operating substantially as described.

2d, An adjustable spring bumper head, J, arranged in relation to the weighted drop beam, F, toggles K K', and piston l in steam cylinder, A, for regulating the throw of bolt-heading dies, substantially as and for the purposes hereinbefore set forth.

83,377.—DIE FOR BOLT-MAKING MACHINES.—Robert Gracey, Pittsburg, Pa.

I claim, 1st, The combination of the dies, a a', die blocks, b b' and plunger, f, with or without the socket, o, said parts being arranged substantially as described.

2d, The griping dies, a a', with raised projection, d, in combination with the die blocks, b b', having water passages, n n', when so arranged, substantially as hereinbefore described, as to form an enclosed space for the passage of water around the raised portion of the dies whenever the heading tool is withdrawn.

83,378.—INDEX.—Henry H. Hall, Boston, Mass.

I claim the within-described index or tabular guide to indexes, consisting of the combination of letters and figures, substantially as and for the purposes set forth.

83,379.—IRONING TABLE.—L. Harrington, Saugatuck, Mich.

I claim a folding table, made with a three part top, A B C, in combination with flat iron holder, H I, hinged leg, G, supporting a pivoted bearer, S, and bearer, T, constructed and arranged to operate substantially as and for the purpose set forth.

83,380.—CHECK-VALVE FOR STEAM AND OTHER ENGINERY.—Joel Hayden, Jr., Haydenville, Mass.

I claim the combination of the valve, J, cup, F, connecting rod, G, outlet, D, and inlet, C, with a partition, A, and valve seat, B, between them, whereby the fluid or liquid is enabled to close the valve by its pressure against the cup, when the valve is relieved from outside force, substantially as herein described and shown.

83,381.—BUCKLE.—Henry Herbert, Jersey City, N. J.

I claim the self-fastening buckle, consisting of a frame and two slotted slides, for the purpose substantially as described.

83,382.—HOT BLAST APPARATUS FOR PUDDLING AND OTHER FURNACES.—P. Hoop, Jr., and R. Hoop, Berlin Cross Roads, Ohio.

We claim, 1st, The rings, C, provided with the lugs, c, in combination with the foundation plates, c, as and for the purpose described.

2d, The rings, C, in combination with the pipes, D, made in three or more sections, and having their middle portions outside the chimney, as and for the purpose specified.

83,383.—DEVICE FOR SHARPENING SAWS.—David Huffman, Luray, Va.

I claim the block, A, jaws, B B, and screws, c c, when constructed and arranged as described, and for the purpose set forth.

83,384.—STEAM GENERATOR.—R. W. Humphreys, Clarksville, Tenn.

I claim a steam boiler, in the form of a hollow cylindrical annular ring, with fire box and fire flues, and smoke stack, attached substantially in the manner herein shown and described.

83,385.—ELEVATOR.—Amos B. Hunt, Matteson, Mich.

I claim, 1st, The crane, B, crane post, A, sheaves or pulleys, arranged at the points, d f u and t, rope or cord, C, arranged on the sheaves and passing down through the axis of the crane, in combination with a sweep bar, G, all substantially as set forth.

2d, The swivel hook, l, and its accessory parts, m j n, in combination with the pin, o, and trip-ring device, r q, all substantially as herein set forth.

3d, The crane, B, when constructed of planks and parts, a a g g e b d, substantially as described, in combination with the crane post, A, bearing blocks, h h, sweep bar, G, cord or rope, C, and pulleys at the points, d f u and t, all as set forth.

83,386.—PLANT PROTECTOR.—J. M. Hurt, Blacks and Whites, Va.

I claim, as a new article of manufacture, the plant protector, consisting of the cylinder, A, adapted to rest upon the ground over the plant, perforated circumferentially near its top, a a, B, and provided with the horizontal glass top, C, as herein described for the purpose specified.

83,387.—SHOULDER BRACE AND SUSPENDER.—Ebenezer Jennings, Jr., New York city.

I claim, 1st, A combined shoulder brace and suspender, consisting of two straps crossing each other at both ends in adjustable slides, substantially as described, either with or without an adjustable slide at the back crossing.

2d, The adjustable double slide, cut from a single piece of sheet metal, or other suitable material, substantially as described.

83,388.—BEE HIVE PROCTECTOR.—Alfred S. Johnson (assignor to himself and Lyman B. Balcom), Waupun, Wis.

I claim, 1st, The casing or box, A, composed of paper or *papier maché*, for encasing a bee hive, substantially as herein shown and described.

2d, The shield or projection, a, attached to the case, covering, or box, substantially as and for the purpose specified.

83,389.—APPARATUS FOR MAKING EXTRACTS FROM TAN BARK.—Thomas W. Johnson, New York city.

I claim the arrangement of a secondary saturating tank, J, and two sets of squeezing rollers, G M, in combination with the crushing rollers, A, saturating tank, C, and elevators, E K, all substantially in the manner herein shown and described.

83,390.—KNITTING MACHINE.—Daniel Kidder, Franklin, N.H.

I claim, 1st, The detachable stock, D, adapted and employed for the reception of the cams and yarn feeder, substantially as set forth.

2d, The yarn feeder, G, elevating cam, F, and slotted depressing cam, E, secured to the stock, D, substantially as and for the purpose described.

83,391.—LAMP CHIMNEY CLEANER.—Michael J. Lourrentz (assignor to himself and John Myers, Jr.), Leavenworth, Kansas. Antedated October 17, 1868.

I claim, as a new article of manufacture, the holder for lamp chimney cleaners, consisting of the two rods, A A', each double headed, the rod, A, passing through the button at the inner end of the rod, A', and *vice versa*, whereby the cleansing material is held between the inner head of one rod and the outer head of the other, as herein shown and described.

83,392.—APPARATUS FOR ILLUSTRATING SPHERICAL TRIGONOMETRY.—Stephen N. Manning, Kankakee, Ill.

I claim the combination and arrangement of the hinged sector, plates, and wires, constructed substantially as described, for the purpose of illustrating and demonstrating the problems of spherical geometry and trigonometry, by forming the diagrams so as to show all the parts in their true relative positions and proportions.

83,393.—PINTLE OR BUT HINGE.—Lorenz Maschauer and William Frankfurth, Milwaukee, Wis.

We claim the pintle, B, made of uniform diameter in its middle and upper part, and provided with a tapering expanded lower end, c, in combination with the tapering internal diameter of the upper eye, a substantially as and for the purpose set forth.

83,394.—BRICK KILN.—John McDonald, New York city.

I claim the tunnel or kiln, provided with a door at each end, and with a chimney, and with apertures through the side walls, for the management of the fires, substantially as described, in combination with movable platforms, on which the bricks to be burned are to be stacked, with archways in which the fires are to be made for burning the bricks, substantially as and for the purpose described.

83,395.—SINGEING MACHINE FOR FABRICS.—Peter McEwen, Jersey City, and Wm. McKenzie, Hudson City, N. J.

We claim the arrangement of the rollers, b c f, stretching bars, e e, g g, and rows of burners, l m, for presenting both sides of the fabric to be singed, as and for the purpose set forth.

83,396.—RAILWAY SWITCH STAND.—R. L. McGowan and Walter Fletcher, Alliance, Ohio.

We claim the lever, c, in combination with the sliding key, b, slot, a, and recesses, a', substantially as described.

83,397.—BILLIARD CUE.—J. N. McIntire, New York city. Antedated October 6, 1868.

I claim a telescopic billiard cue, having a false or spring but, so constructed as to yield to any pressure, and again resuming its natural position, substantially as described for the purpose set forth.

83,398.—SEWING MACHINE.—Nicholas Meyers (assignor to Edward L. Chamberlayne and Emerson C. Pomeroy), Buffalo, N. Y.

I claim the feed plate, e', in combination with the shank, c, arm a a' a'', spring bar, c', and eccentric, b, as and for the purpose described.

83,399.—WASH BOILER.—C. E. Miller, Indianapolis, Ind.

I claim the combination of the false bottom, C, perforated hinged flaps, D D', columns, F, and nozzles, G G', all constructed and arranged to operate substantially as and for the purposes herein described.

83,400.—HOLDBACK.—Rufus Moody, Monmouth, Me.

I claim the loop, b c d, in conjunction with the plate, e, piece, f, plate, k, and hinge, h, to be operated by the breeching strap of the harness, as herein described, when attached to a carriage shaft, as and for the purposes set forth.

83,401.—ELBOW JOINT FOR STOVE PIPES.—H. B. Morrison, LeRoy, N. Y.

I claim, 1st, A cast iron elbow, for stove and hot air pipes, made entire, with a suitable connecting and disconnecting joint, substantially as set forth.

2d, An elbow, for stove and hot air pipes, in which the joint is so formed and connected that the arms or ends of said elbow may be turned to any position, from a right angle to a straight length, as described.

3d, The combination and arrangement of the lugs, F, notches, g, groove, h, and tongue and groove, c d, the whole constituting the joint, as herein described.

83,402.—MACHINE FOR PREPARING HUSKS FOR MATTRESSES.—William Nash and Montgomery Kenfield, Malden, Mich.

We claim the arrangement and combination of the feed rollers, E and F, the spiral cutting cylinder, D, and the series of slitted springs, a a a, as constructed, and operating substantially in the manner as and for the purposes herein set forth.

83,403.—BUTTON.—Chas. N. Nickerson (assignor to himself and Wm. Hodgkins, 3d), Gloucester, Mass.

I claim the combination of the sleeve, E, stud, A, and spring, C, substantially as described.

93,404.—CONVERTIBLE PLOW AND CULTIVATOR.—Johnson Orr and Henry H. Martin, Oxford, Ohio.

We claim, 1st, The combination and arrangement, substantially as described, of the frame, A C, c c', swinging hangers, D d and D' d', adjustable bars, E e and E' e', nuts, G G', ring bolts, F f and F' f', pins, H, apertures, I, plow beams, J J', pivoted sheths, K k, ties, M, pins, N, handles, O, braces, R, r and R' r', and catch, S, for the object stated.

2d, The construction of the brace, T, with depressed partions, t t, to serve as steps, and an elevated central portion, t', to which the seat, P, is attached, all as herein described.

83,405.—GRINDING MACHINE.—John L. Otis, Leeds, Mass.

I claim, in a grinding machine, in which the article to be ground is moved past the face of the grinding wheel or stone, the hanging of either the stone or wheel, or of the clamp frame that carries the thing to be ground, in arms or a swinging frame, whose center of motion is remote from the center of motion of the wheel or stone, for the purpose of grinding the tool or implement on a concave from a greater radius than that of the stone or wheel, substantially as described.

Also, the feeding along of the tool or article to be ground, past the face of the wheel or grindstone, by means of the vibrating frame, reversible pawl, and its spring arm or support, and the ratchet plate, acting together in the manner and for the purpose described.

83,406.—TENSION DEVICE FOR SEWING MACHINE.—D'Arcy Porter (assignor to himself and Thomas H. White), Cleveland, Ohio.

I claim the tension device, consisting of the grooved wheel, C', shaft, B', cap or box, c', spring, I', screw, H', stay, D', and spring, G', all arranged upon standard, A', and with relation to each other and to the thread, E', and so as to operate substantially in the manner and for the purpose described.

83,407.—RESERVOIR COOKING STOVE.—Julius F. Quimby, Troy, N. Y.

I claim, 1st, Combining the chamber or flue, c, of a water reservoir or tank, C, when constructed and arranged with a cooking stove, substantially as herein described, with the diving or descending flue, e, thereof, so as to divert a portion of the unspent currents of heat going theredown therefrom, and making them pass directly into and horizontally through said flue, c, without first passing under the stove's oven, as formerly, thus making said reservoir flue, c, a branch flue of the diving flue, e, in manner substantially as and for the purposes hereinbefore set forth and shown.

2d, Connecting each end of said branch flue, c, when extending or passing in horizontal direction around the end sides and rear side of said water reservoir or tank, C, as arranged at the rear end side of a cooking stove, respectively, with the diving and rising flues, e and f, thereof, by means of apertures, a and a', in the stove, opposite to the ends of said flue, c, in manner substantially as described and shown for the purposes set forth.

3d, The combination with each other of the extended or branch flue, c, passing in horizontal direction around the end sides and back side of a water reservoir or tank, C, the cross flue, b, as passing in horizontal direction, and connected at each end with said flue, c, and the diving and rising flues, e and f, as connected with the respective ends of said extended flue, c, by apertures, a and a', when all of a reservoir cooking stove, and relatively arranged in manner substantially as herein described and shown for the purpose set forth.

4th, In combination with the damper, G, branch flue, c, aforesaid, and the aperture, a, in the diving flue, e, the employment of a damper, d, to close the opening to said flue, c, to shut off all currents of heat therefrom, and thus make of said flue an air-chamber, for the purpose as herein before set forth.

83,408.—COMPOUND FOR PRESERVING CHEESE.—Fitch Raymond and August Miller, Cleveland, Ohio.

We claim the herein described compound for the purpose set forth.

83,409.—MODE OF PREVENTING MILDEW OR INJURY TO FIBROUS MATERIALS DURING THEIR MANUFACTURE.—Edwin T. Hice, New York city.

I claim moistening flax or other fibers with the material specified, so as to prevent mildew or other injury to the same while being manufactured, substantially as set forth.

83,410.—BIT STOCK.—George Richards (assignor to himself and Dexter E. Pease), Richland Center, Wis.

I claim the handle, A, provided with the sockets, B B, to receive adjustably both the shank, b, of the rest, D, and the shank, a, of the tool-holder, C, whereby the leverage of the handle is adjusted equally from the rest and tool holder, as herein shown and described.

83,411.—STOP DEVICE.—Peter Rodier, Detroit, Mich.

I claim a lever, resting in suitable bearings, and operating automatically, both to stop a belt, by compressing it between the end of said lever and another rigid body, upon the opposite side of the belt, and also to release its hold upon the belt, both operations being performed by the action or movement of said belt itself, substantially as herein described and set forth.

83,412.—MATCH COMPOSITION.—William H. Rogers, New York city.

I claim the use of caoutchouc, (or india-rubber), or gutta-percha, in a composition for the manufacture of matches, substantially as and for the purposes described.

83,413.—DISH RACK.—E. A. Sawyer, Portland, Me.

I claim the dish rack, as described, having the pan or base, a, with the horizontal parallel pairs of helices, all combined and arranged as and for the purposes set forth.

83,414.—FABRIC FOR COVERING STEAM BOILERS, ETC.—William C. Selden, Brooklyn, and Charlton B. Kid, New York city.

We claim the non-conducting coating herein described, composed of fibrous mineral, secured between layers of strong material, substantially as and for the purposes herein set forth.

83,415.—HOT-AIR FURNACE.—Eli Slater, and Anson H. Platt, Philadelphia, Pa.

We claim the combination of the inner combustion cylinder or chamber, a, outer radiating cylinder or chamber, o, surrounding the same, and the close base, b, all constructed and arranged so that the draft and products of combustion pass down from the first, through the fire grate, g, into the base, and thence up through the space between the two cylinders, substantially as and for the purposes herein specified.

83,416.—WOOD-SAWING MACHINE.—Daniel Snell (assignor to himself and J. B. Gano), Springfield, Ohio. Antedated May 28, 1868.

I claim the combination of the spikes or spur points, C C, in the forward ends of the bed timbers, to pierce the log to be sawed, and the grab or cant hook, B, in addition thereto, hinged or fastened to the forward cross beam, the whole constructed substantially as described as and for the purpose specified.

83,417.—PURIFYING ILLUMINATING GAS.—Peter Spence, Newton Heath, Manchester, England.

I claim the use of protosilicates and protocarbonates of iron, specially the slags before mentioned, for purifying gas, for lighting, from sulphureted hydrogen, and also the use of these substances, as specified, for the product of dry copperas, or the copperas of commerce, and the use of said dry copperas for purifying gas from ammonia.

83,418.—CAR BRAKE.—Joseph Steger, New York city.

I claim the combination of the roller, G, lever, E, friction bar or plate, L, and axle, B, substantially as described, for actuating the brakes of a car.

83,419.—PORTABLE GAS APPARATUS.—M. C. Stebbins, Springfield, Mass.

I claim the combination of the vessels, C and D, and the gasometer, B, with their pipes and connections, all arranged and operating substantially in the manner and for the purposes herein specified.

83,420.—BLASTING VESSEL.—J. B. Stoner, L. Mendelson, and Theodore Crommelin, New York city.

We claim, 1st, So applying a ballasting weight, B, to a casing, D D', or its equivalent, that such weight can be raised or depressed bodily, and at the same time it is free to swing in a direction with the keel of a vessel, substantially as and for the purposes described.

2d, The arms, b, of weight, B, provided with a pin, C, whose ends are fitted to slide up and down, and to oscillate in grooves, c c, formed in the case, D D', substantially as described.

83,421.—BLIND SLAT OPERATOR.—L. W. Swafford, E. Butler, and J. R. Hess, Muscatine, Iowa.

We claim the bent arm, G, and slotted lever, E, arranged, with relation to the blind slats and window casing, in such a manner that their combined action shall adjust said blind slats in any required position, as herein shown and described.

83,422.—CAR BRAKE.—Benjamin Tatham and Joseph Steger, New York city.

We claim, 1st, The reversing arrangement, as herein substantially described, by which the brakes of a car may be brought into alternate action by the motion of the plate and axle.

2d, The means, as herein substantially described, of applying the brakes simultaneously upon the wheels of a series of cars by the combined operation of a connecting rope, chain, or rod, upon a series of levers, one on each car, the levers having friction rollers, and acting, by the revolution of the axles, on the brakes, as set forth.

83,423.—MANUFACTURE OF VINEGAR.—H. A. Tilden, New Lebanon, N. Y.

I claim the jacket, f, around the vat, a, with the openings, 2 and 3, in combination with the heating coil, g, as and for the purposes set forth.

83,424.—HYDRAULIC PRESS.—J. B. Tunstall, Boydton, Va.

I claim the arrangement, herein described, of cross head, D, attached to levers, E E', by link connection, x, segment gearing, o o, rack, g, press head, G, shaft, F, pulley, f, with its cord and weight, all constructed and operated as set forth.

83,425.—METHOD OF CONSTRUCTING WROUGHT-IRON COLUMNS.—Geo. Walters and Thos. Shaffer, Phœnixville, Pa.

We claim an improved column, formed by the combination of the segmental bars, C, skewback bars, A, and interior rings or bands, B, with each other, substantially as herein shown and described, and for the purpose set forth.

83,426.—RING FOR SPINNING MACHINE.—J. W. Wattles, Canton, Mass.

I claim my improved ring, as made with the traveler supporter or rail, a, and the oiling trough, b, arranged as represented in the accompanying drawings, and as hereinbefore described, such being so as to cause the traveler, on ceasing to revolve on the supporter, to dip its lower part into such groove as and for the purpose specified, when such groove may be supplied with a lubricating fluid.

83,427.—ROTARY STEAM ENGINE.—James D. Whelpley, Boston, Mass.

I claim, 1st, The friction cradle, consisting of exterior bearing rolls, b, and the interior ring, a, in combination with the abutment ring, G, substantially as described.

2d, The arrangement of the interior friction ring, a, whereby its axis of revolution coincides with the axis of revolution of cylinder, A, substantially as described.

3d, The arrangement of the steam cylinder, D, revolving on its axis, perpendicular to the axis of its piston cavity, and carrying the reciprocating piston E, combined with the rod, F, abutment ring, G, and friction roll, a, substantially as described.

4th, The arrangement of the steam cylinder, D, the reciprocating piston, E, rod, F, abutment ring, G, and friction rolls, b, substantially as described.

5th, The combination of the eccentric, m, gib, l, eccentric, k, gib, l, and valve plate, h, with reference to the rod, n, and ears on the induction pipe, H, substantially as described.

6th, The arrangement of the valve chest, C, valve plate, o, with the packing, p, and adjustable eccentric, r, substantially as described.

7th, The arrangement of the cylinder, A, with the trunnion, K, revolving with it, abutment ring, G, and its friction cradle, b and a, and the neck, B, of the steam chest revolving with cylinder, A, with reference to the fixed steam pipe, H, substantially as described.

8th, The arrangement of the valve plate, h, revolving about a ring, k, held from revolution by ears on pipe, H, thereby allowing linear motion when combined with the adjustable interior eccentric, m, pivoted on the axis of revolution of cylinder, A, substantially as described.

83,428.—APPARATUS FOR TOLLING GRAIN.—Wm. S. Widger and Wm. M. Read, Fairfield, Iowa.

We claim the rotary funnel, A, having a spout provided with the movable part, C', adjusted by means of the slot and set screw, all arranged and operating substantially as herein set forth.

83,429.—TRAP NET.—Wm. S. Wilcox, Wellington, Ohio.

I claim, 1st, The supplementary funnel, G, and cover, C', as arranged, in combination with the funnel, C, and pound, A, in the manner as and for the purpose set forth.

2d, The use of weights, J, for sinking and anchoring the net, in combination with buoys, in the manner substantially as described.

83,430.—CONDENSER.—Wm. L. Winans, Clarges Street, England, and Thomas Winans, Baltimore, Md. Patented in England March 23, 1866.

We claim the means herein set forth of constructing the condensers of steam engines, and providing for the drawing off therefrom of the greasy water or scum that may accumulate therein.

83,431.—BEER COOLER.—George Winter, Buffalo, N. Y.

I claim, 1st, The tanks, A, in combination with the reservoir, B, and conducting pipes, D, all parts being constructed, arranged, and operating substantially as herein described.

2d, Supporting the tanks, A, within the reservoir, B, by means of the upright posts or rods, B', and cross bars or tie rods, C, substantially as set forth.

3d, The reservoir, F, in combination with the tanks, A, for the purposes and substantially as herein described.

83,432.—WARDROBE BEDSTEAD.—Albert A. Young (assignor to himself, Helen J. Dalton, and Geo. W. Armstrong), Boston, Mass.

I claim the combination and arrangement of the several parts of the wardrobe bedstead, to wit, the case, A, with its drawers, B B, the two parts of the bed frame, d d', joined by the hinges, i i, with its pillow rest, e, its cord, p, with its springs, s, the intermediate legs, k k, having supports, q q, and the turn-down legs, j j, and the sacking, g, all combined and arranged substantially in the manner and for the purpose set forth.

83,433.—PROCESS AND COMPOSITION FOR TANNING LEATHER.—G. Zippe (assignor to himself and Werner Werner), New York city.

I claim, 1st, The composition herein set forth for impregnating hides during the tanning process.

2d, The process herein set forth of tanning hides.

3d, The soaping compound herein described for insolubly binding the metallic contents of the tanning compound.

82,434.—CARTRIDGE.—John Abraham and Thos. R. Bayliss, Birmingham, England. Patented in England March 20, 1868.

We claim, 1st, Making a series of longitudinal, oblique, or helical incisions in the metallic cases or shells of the said cartridges, for the purpose and substantially as hereinbefore described, and illustrated in the accompanying drawing.

2d, The construction, substantially as herein described, of the percussion chamber, by forming the same, as shown and set forth, of a blank, independent from the cartridge case, and securing it in the rim of the case, as herein described.

3d, The combination with a cartridge case provided with a percussion chamber constructed as described, of a primed percussion pin, enlarged at its base, so as to close tightly the said chamber, substantially as herein set forth.

83,435.—WASHING MACHINE.—Anson T. Adams, Indianapolis, Ind.

I claim, 1st, The application of the lever, A B, and the perforated bottoms F G and H I, to an ordinary wash boiler, for the purpose and in the way substantially as herein set forth.

2d, The combination of the hook, g h, and the lug, a c, with a common wash boiler, with perforated bottoms, constructed as aforesaid, and used in the way and for the purpose herein set forth.

83,436.—FLYER FOR SPEEDERS.—John H. Aldrich (assignor to himself and John C. Whitin), Northbridge, Mass.

I claim the flyer substantially as described, having the arm of the flyer and the detachable presser connected by a spiral guide and worm, so that when turning one way the presser detaches from the flyer, when there is no bobbin or spindle for it to press against, and turning the other way, it stops by the presser arm itself coming in contact with the end of the flyer arm, thus forming a more direct passage for the roving to the presser arm, substantially as described.

83,437.—VINE CUTTER AND GARDEN CULTIVATOR COMBINED.—Prudden Alling, Norwalk, Ohio.

I claim the wheel, B, cutter, C, cultivator, D, and beam, A, combined and arranged to operate in the manner as and for the purpose set forth.

83,438.—GRAIN CLEANER.—John E. Anderson, Boiling Springs, Pa.

I claim, 1st, The scouring wheel, substantially as described, when forming part of a grain cleaner, as set forth.

2d, The arrangement of the scouring wheel above the fan wheel, with the chute board, K, inclined screen, L, and chaff box, B, all substantially as set forth.

83,439.—SASH FASTENER.—Daniel Armstrong, Chicago, Ill.

I claim the arrangement of the thimble, B, and coil spring, m, the latter fitting into the ends of the bolts, A A', and operating both of them at the same time, in combination with thimbles, G G, pins, d d, and thumb pieces, e e, as and for the purpose set forth.

83,440.—COMPOUND TO BE APPLIED TO THE HAIR.—Benj. F. Atwood, New York city.

I claim, 1st, A hair stimulating compound consisting chiefly of a decoction of quince seed and smart weed, substantially as herein described, as a new article of manufacture.

2d, The addition to the said quince seed and smart weed, of sage, sweet fern, and hemlock bark, to form a modification of the compound, substantially as described, the whole being softened with glycerin, all as set forth.

83,441.—PEAT MACHINE.—N. Aubin, Plattsburg, N. Y.

I claim the cylinder, A, provided with the stationary shear bladed cutters, E, shaft, C, with trough shaped revolving knives, F, and mold, D, with its removable bottom, d, having angular projections, d1, all arranged together together and operating substantially as and for the purpose herein set forth.

83,442.—CAR BRAKE.—Wm. W. Babcock, Harmar, assignor to himself, A. W. McCormick, and Samuel S. McNaughton, Marietta, Ohio.

I claim, 1st, The combination of the screw spindle, C, cross bar, G lever, H, and brake head, I, when said parts are constructed to operate substantially as described.

2d, The combination of the screw spindle, C, cross bar, G, lever, H, arm, J, and wedge shaped brake head, K, when constructed to operate in the manner set forth.

3d, The arrangement of the brake heads, I K M, wheels, B B, levers, H L, cross bar, G, and screw spindle, C, as described and shown.

83,443.—SAW GRINDING MACHING.—John G. Baker (assignor to Henry Disston), Philadelphia, Pa.

I claim, 1st, A saw grinding machine in which two stones are so arranged that a line drawn through their centers shall be at an angle with the blade of the saw, as and for the purpose herein set forth.

2d, The combination of the above with the guides, E and E'.

83,444.—STEAM ENGINE VALVE DEVICE.—William Baxter, Newark, N. J.

I claim, 1st, The piston, K, and barrel, J, in combination with the valve, H, substantially as herein described.

2d, The regulating valve, g, in combination with the barrel, J, piston, K, and valve, H, substantially as herein set forth.

83,445.—STEAM GENERATOR.—William Baxter, Newark, N.J.

I claim the arrangement of the fire box, A, flues, D, jacket, F, pipe, K, and steam dome, G, substantially as set forth.

83,446.—SPLICE FOR RAILROAD RAILS.—Sidney A. Beers. Brooklyn, N. Y.

I claim the combination and arrangement of the flat bolt and nut with fishing plates, as illustrated by letter e, fig. 1", and letter c, fig. 3, when applied to any form of rail.

Also, the device for preventing the nut from working loose, as illustrated by letters c and d, in fig. 1", whether used separately or in combination, for the purposes above set forth.

83,447.—SHIRT AND DRAWERS COMBINED.—Erastus S. Bennett (assignor to himself and Justus Smith), Brooklyn, N. Y. Antedated Oct. 7, 1868.

I claim, 1st, The combination of the shirt or body, E E, drawers or legs, F, and the reinforced portion, B and C C, all substantially as described and for the purposes set forth.

2d, In combination therewith, the drawing string or adjuster, a a, applied and operating substantially as described.

83,448.—MOLD BLACKING MACHINE.—Benj. S. Benson, Baltimore, Md.

I claim, 1st, Supplying the brush and mold with blackwash, or facing, for coating the inner surface of pipe molds, through a hollow shaft or tube, while the brush is spreading and smoothing it.

2d, The reservoir, D, communicating pipes, E F, valves, e' c, and hollow revolving shaft, in combination with a revolving reciprocating brush.

3d, The spool, H, and pawl or latch, h, in combination with the cord, I, and pulleys, i i.

4th, A revolving reciprocating brush, in combination with a force pump, so arranged that it will supply the brush with the blackwash at the time of its being rotated.

83,449.—TEA KETTLE BOILER.—Alfred Berney, Jersey City, N. J.

I claim a combined tea kettle boiler, pitcher, and measure, made of tapering form, as described, and provided with a handle, lid, and spout, and graduated into quantities, essentially as herein shown and described.

83,450.—STIRRUP.—John Bond, Versailles, Ill.

I claim as a new article of manufacture the riding stirrup consisting of the elastic pendent prongs, A, between which the oscillating foot piece, B, is pivoted in such a manner as to fall out when the elastic prongs are spread apart, as herein described, for the purpose specified.

83,451.—MODE OF SOLDERING GALVANIZED IRON.—Patrick B. Bonner, New York city.

I claim the process of soldering galvanized iron, substantially as herein described and set forth.

83,452.—HORSE RAKE.—S. C. Brinser, Middletown, Pa.

I claim the combination and arrangement of the lever, H, curved as described and shown, with the connecting rod, F, having a series of holes in its rear end; the frame, K, having the series of holes, k'; the arm, E, and the rake teeth, B B, when the said parts are so constructed and combined together as to operate in connection with a pin in the frame, K, substantially in the manner described.

83,453.—SCISSORS.—Sarah H. Brisbane, Fordham, N. Y.

I claim, 1st, The combination with a pair of scissors of a gage or measure, B, substantially as and for the purposes set forth.

2d, A pair of scissors one blade of which is provided with a slot at right angles to the line of its cutting edge, in combination with a gage or measure, B, substantially as and for the purposes set forth.

83,454.—TRACE FASTENING.—James Brown, Matteawan, N.Y.

I claim, 1st, The socket, A, having a tapering dovetailed groove formed in its outer end, the strap or bar, B, having its rear part dovetailed and tapering, and having a cross head, b', formed upon its rear end, and the spring, C, or equivalent, in combination with each other, substantially as herein shown and described and for the purpose set forth.

2d, Forming an inclined recess, a', in the bottom of the forward end of the dovetailed groove in the end of the socket, A, to receive the end of the spring, C, in detaching the fastening, substantially as herein shown and described, and for the purpose set forth.

83,455.—HOSE COUPLING.—Henry C. Bull and Samuel T. Shelley, Louisville, Ky.

We claim a hose coupling, consisting of the following elements: The female portion, E, with its concave shoulder, f, the male portion, F, having the elastic ring or tube secured therein, and the eccentric ring, D, all constructed and combined substantially as herein described.

83,456.—AUTOMATIC SPADING PLOW.—Francis L. Cagwin, Joliet, Ill.

I claim, 1st, The spades, a, when operating in the manner and by the devices described, so as to enter the ground on the cycloid line, as set forth.

2d, The maintaining of the parallel between the spades, a, from the time of their entry into the ground until the heel of the spades comes to a rest up against the drum or disk, b, to any given point, either before or past the hinge, by means of the traction and weight of the machine causing them to turn on their hinge, as described.

3d, The backward turn of the spades, a, from the cycloid entry line to their original position, as described, by means of the upright lever, e, and spring, l, as set forth, regulated to stop at any given cycloid point by means of the device shown in fig. 5, or its equivalent.

4th, The spades, a, constructed with a crank and hinge, when attached, as set forth, to the periphery of the drum or disk, b, in combination with the upright lever, e, and spring, l.

5th, A rotary spacer or plow, constructed with spades, a, hinged to the drum or disk, b, as shown, in combination with a frame, constructed and operating substantially as set forth.

6th, The mode of leverage, substantially as described, to force the spades into the ground, and to raise them out of the ground, when desired, as set forth.

7th, The combination of all the parts described, when arranged and operating as set forth.

83,457.—STEAM GENERATOR.—Charles W. Cahoon, Portland, Me.

I claim, 1st, The boiler, A, with the pipe, B, flexible by means of the joints, D D, having the coupling, E, and valves, substantially as herein set forth and described.

2d, The combination of boiler tank, F, with the boiler, A, and with reference to the carriage, C, substantially as herein described.

3d, The combination of pipe, G, flexible, as described, and having the coupling, whereby to convey the residuum of the carriage reservoirs into the boiler tank, F, as described.

4th, In combination with the boiler, A, having a supply pipe, B, for connecting with the carriage, C, to supply the tanks therein, as described, the relief pipe, b, with its valve, c, substantially as described.

83,458.—DOUBLE OVEN COOKING STOVE.—Edward Card, Providence, R. I.

I claim placing the forward oven, with its accompanying flue, upon joints or hinges, substantially as described.

Also, the division plate, h, in combination with either of the division plates, 1 or 1', and plate, a, substantially as described.

83,459.—PEACH BASKET.—Henry Carpenter, Brooklyn, E. D., N. Y. Antedated October 17, 1868.

I claim securing the raised bottom of the peach basket upon the inner hoop, D, by means of the central batten, a, let into said hoop at each end, beneath the bottom, and by the wires, c, and screws, b, all arranged as described, whereby the bottom and batten are raised above the lower edge of the hoop, D, and prevented from being knocked into the basket, when the latter is inverted and used as a seat, as herein shown and described.

38,460.—IRONING TABLE.—Patrick P. Carroll, Washington, D. C.

I claim a combined ironing and work table, consisting of the sliding parts, C C C, and supplementary legs, D D, in combination with a table of the usual form and construction, substantially as herein shown and described.

83,461.—ELEVATOR FOR BUILDINGS.—Dexter H. Chamberlain, West Roxbury, Mass.

I claim the rods, c c, or their equivalents, in combination with the wedges, d d, or their equivalents, and the cross head, C, substantially as and for the purpose set forth.

Also, the levers, H H, spring, h, and pin, G, in combination with the wedges, d d, and the rods, c c, for the purpose described.

83,462.—LAMP.—Theodore Clough, Dobb's Ferry, N. Y.

I claim the two opposite segmental wick tubes, in combination with the air jet pipe, having a gas burner, nozzle, when arranged in combination, substantially as described.

83,463.—HAMMER.—T. S. Coffin, Harrington, Me.

I claim the hatchet, D, adapted to be removably attached to the hammer head, A, having the short claws, S, by means of the screw, E, and held in any desired position by the spring catch, a b d, as herein described for the purpose specified.

83,464.—CAR COUPLING.—F. Coffrin, Claremont, N. H.

I claim the levers or keepers, f, the pins, h, the spindles, g, the springs, i, the staple, l, the hooks, e, and link, D, all arranged and combined substantially as and to operate for the purpose specified and set forth.

83,465.—MACHINE FOR TWISTING JACK BANDS.—J. Collier, Morenci, Mich.

I claim the combination of the hook, H, levers, I and L, sliding wheel, C, hooks, F, and springs, G K, substantially as and for the purpose described.

83,466.—STAVE MACHINE.—William S. Colwell, Allegheny City, Pa.

I claim the combination of the wheels, f g h and i, with the rack, e, for imparting a reciprocating motion to the ram, B, substantially as herein described and set forth.

83,467.—REFRIGERATOR AND COOLER.—Levi Richardson Comstock and James N. Cherry, Keokuk, Iowa.

We claim, 1st, The combination of the ice chamber, K, with the horizontal detachable strainer, L, and chamber, I, and hinged lids, C C', as and for the purpose specified.

2d, The combination of the non-conducting chambers, A P, and the trough, O, and pipes, N and M, as and for the purposes specified.

83,468.—CALL BELL.—Ezra G. Cone, East Hampton, Conn.

I claim the combination, with a suitable handle, of two gong shaped or open mouthed bells, provided with a suitable clapper or clappers, substantially as arranged, and as herein specified.

83,469.—COG WHEELS FOR GEARING.—Horace I. Crandall, Bedford, Mass.

I claim, 1st, The teeth of cog wheels, for gearing, constructed as hereinbefore described.

2d, The thickness of the teeth spaced at right angles from the center line of the same, substantially as set forth.

3d, The meeting point of the root and point face circles inside of the pitch circle, in accordance with the rules as specified.

4th, The radii, for sweeping the faces of the teeth, obtained from the wheel containing the least number of teeth in a set, as so described.

83,470.—HAY ELEVATOR.—F. A. Crane, Zanesville, Ohio.

I claim, 1st, The combination of the plank A, having lashings, B, side rails, C, with the truck, D E E, rollers, G, catch lever, H, having a shoulder, h, and stirrup plate, I, shoulder cleat, J, expanding pulley, a a, having shoulders, K, with india-rubber block interposed between them, rope, K, and pulley, L, all constructed and operating together, substantially as shown and described.

2d, The pulley, constructed as described, of the circular plates, a a, having radial shoulders, k, clamping between them the india-rubber disk, b, in such a manner that the width of the disk and the distance between the plates are made adjustable for the purpose specified.

83,471.—PRINTING PRESS.—Royal Cumming, Newport, Vt.

I claim, 1st, The pressure cylinders, C C', in connection with the reciprocating type beds, B B', and the paper feed rollers, I I', J J', all arranged to operate in the manner substantially as and for the purpose set forth.

2d, The combination of the two impression cylinders, C C', revolving in opposite directions above the reciprocating beds, B B', with the paper carrying cylinders, I I', J J', substantially as described, for the purpose specified.

83,472.—SUBSOIL PLOW.—John Custer, Corsica, Ohio.

I claim, 1st, The share bar, D I K, with slots, d and h, when constructed and used in combination with the plow beam, A, and rear beam, B, substantially as and for the purpose herein specified.

2d, The peculiar arrangement and combination of the share and shoe, F G, bolts, f f, and share bar, D I K, the several parts being arranged substantially as and for the purpose specified.

3d, The peculiar arrangement and combination of the share and shoe, F G, with common point, g, the cutter, E, share bar, D I K, and plow beam, A, the several parts being arranged substantially as and for the purpose specified.

83,473.—WASHING MACHINE.—John Dare, Liberty, Ind.

I claim the arrangement of the roller, D, pawl, j, and ratchet, f, for allowing the same to move without revolving one way, and to revolve the other, when suspended from the arms, C, and exterior adjustable springs, B, and operated by the double lever, H, all as herein shown and described.

83,474.—TELLURIUM.—John Davis, Allegheny city, Pa.

I claim, 1st, Pivoting one pole of the earth to the disk, S, and pivoting it to the crank, 7, and operating said disk and crank through the medium of disk, 6, wheels, t x l 5, and endless screw, 15, the whole being constructed, arranged, and operating in the manner substantially as herein described, and for the purpose set forth.

2d, The inclined disk, B', in combination with disk, 01, stem, 18, and arm, 11, provided with friction wheel, 12, and disks, being constructed, arranged, and made operative through the medium of the mechanism herein described, and for the purpose set forth.

83,475.—APPARATUS FOR TRANSPORTING, EXTENDING, AND ELEVATING PIPES AND HOSE.—Lester Day, Buffalo, N. Y.

I claim, 1st, The reservoir, M, swivel, G, windlass, I, and the extension pipe, C E, in combination with the platforms, A and B, as and for the purpose described.

2d, Pipes, E and F, the latter having a spring cover, u, guide rope, f, annular coupling, g, and belt, v, in combination with case, C, socket, D, raising and lowering devices, j k l n, and guides, r s, as herein set forth.

83,476.—TRACE FASTENER.—F. W. Dean, Tremont, Ill.

I claim the loop, B, hinged to the rear of the single tree, A, and adapted to rest against the front side of the pin, a, outside the trace, and the equivalent of the hoop, B, as shown at D d and e e, all operating as described, for the purpose specified.

83,477.—STITCHING HORSE.—Thomas Depp, San Marcos, Texas.

I claim, 1st, The combination of the seat, D, lever, F, and strap or cord, H, with each other and with the bench, B, and clamps, C, substantially as herein shown and described, and for the purpose set forth.

2d, The combination of the foot lever, K, and strap, or cord, I, with the lever, F, and bench, B, substantially as herein shown and described, and for the purpose set forth.

3d, An arrangement of mechanism by means of which the jaws or the clamps of a stitching horse may be closed to hold the work by the weight of the workman when sitting upon his seat, substantially as herein shown and described.

83,478.—COMBINED CORN PLANTER AND CULTIVATOR.—Charles Dyer, Coal Run, Ohio.

I claim the described arrangement of the flexible tubes, G, rigid tubes, H, standards, I, furrow shares, J, seed coverers, Lx, pivoted braces, Jx, standard, N, shares, M, pivoted brace, O, connecting rod, f, crank shaft, g, and lever, Kx, as herein set forth for the purpose specified.

83,479.—BEE HIVE.—Duncan Edge, St. Mary's, Ill.

I claim a beehive, having the stationary central chamber, with the glass, D, at one end, and the removable piece, a, at the opposite end, with the drawers, B, and doors, C, arranged on opposite sides thereof, all constructed as described.

83,480.—WRINGING MACHINE.—S. F. Emerson, Seville, O.

I claim, 1st, The bearing plate, C2, furnished with axes, C and C1, substantially as and for the purpose set forth.

2d, The bearing plate, C2, furnished with axes, C and C1, slot, d, and hook d', substantially as and for the purposes set forth.

3d, The curved slot, d, and hook, d', in combination with the gears, c c1 b b', rollers, B B1, slotted plate, G, wedge-shaped bearings, h, and plate, C2, with the axes, C C1, substantially as and for the purposes set forth.

83,481.—SHOVEL PLOW.—W. B. Evans, Bracken county, Ky.

I claim the circular conformation of the rear portion of the beam, the front or inner part of which is formed of steel, and reduced to a sharp cutting edge and bent downward at its lower end, for the reception of the plowshare.

83,482.—HORSE HAY FORK.—John Gilmore, Phœnixville, Pa.

I claim the turning knives, C C, provided with the projecting pieces, d d, to prevent the knives from cutting through the hay when the latter is being elevated, substantially as set forth.

83,483.—ROTARY STEAM ENGINE.—Levi F. Goben, Spring Hill, Mo.

I claim, 1st, The construction of the central cylinder, A, with longitudinal channels adapted to receive the pistons, C, of the cylinders, B, substantially as herein shown and described.

2d, The steam chambers, D, having ports, e f, and adapted to receive the central cylinder, having longitudinal grooves, the cylinders, B, provided with pistons, C, and the steam chambers, D, with ports, e f, all arranged within the case, A, to operate substantially as described.

4th, The means for operating the cut-off valve, consisting of the arms, n n, and crank, g, all arranged to operate substantially as herein shown and described.

83,484.—ROTARY STEAM ENGINE.—G. W. Goodwyn, Petersburg, Va.

I claim, 1st, The combination of the rotary valve, H, with the arms, t t t R R R, when so constructed and operating that, by the rotation of the main shaft, the arms, R R, shall be caused to strike and turn the valve, H, substantially as described.

2d, The arrangement of the shaft, B, with the arms, R R R t t t, the rotary valve, H, and the induction port, G, substantially as described.

83,485.—BOTTLE STOPPER.—William Graff, Philadelphia, Pa.

I claim the ribbon, C, or its equivalent, passing around the bottle and over the stopper, in combination with a flexible strip, D, adapted to the ends of the stopper, in combination with a flexible strip, D, adapted to the ends of the ribbon, and to grooves in the said stopper, all substantially as herein described.

83,486.—CAMPAIGN BADGE.—H. C. Griggs, Waterbury, Conn.

I claim, 1st, The combination of the base plate, constructed with the raised surface, A, and provided with perforations, a, with the ring, B, constructed so as to be applied to the plate, and secured through the perforations, substantially as described.

2d, The arrangement of a common pin upon the plate, so as to be secured and held by a notch in the said plate, and so as to secure the badge, substantially in the manner herein set forth.

83,487.—CULTIVATOR.—A. M. Griswold, Momence, Ill.

I claim, 1st, The trucks, B, the slides, F, one or both, when arranged with relation to the rod, D, and beams, E, and to operate as and for the purposes set forth.

2d, The extra shovel, A, when arranged upon the beams, E, substantially as described and set forth.

83,488.—COUPLING FOR RAILROAD-TRAIN HEATERS.—J. R. Guy (assignor to Rice & Guy), Springfield, Ohio.

I claim, in combination with the permanent pipes, G, and elongated, open sockets, H, constructed with daring mouths, the tubular coupling formed by a single rigid pipe, I, terminating with balls, I', fitting said sockets, substantially as and for the purpose set forth.

83,489.—SPRING-BED BOTTOM.—Charles Hacker, Euphemia, Ohio.

I claim the combination of the slats, H K, the spiral springs, A D, the cushioned rail, B, the cords, E F, in the manner shown and described and for the purpose specified.

83,490.—DEVICE FOR SCUTTLING VESSELS.—John Hall, Marshfield, Mass.

I claim the device above described, consisting essentially of the metallic piece, C, having the flanges, c c', the former expanded sufficiently to form a bed, for the gate to slide upon, and having the guide flanges, e e, the gate, G, the rod, R, swivel joint, F, and screw rod, M, all combined in the manner and for the purpose set forth.

83,491.—GRAIN DRILL.—W. N. Hamilton, Odessa, Del.

I claim, 1st, The employment, in the fertilizer hopper or receptacle, of an adjustable bottom, capable of being moved from or toward the distributing wheels, so as to increase or diminish, at pleasure, the size of the openings from which the fertilizing compound in the hopper is discharged, substantially as and for the purposes set forth.

2d, The combination, with the fertilizer receptacle and distributing wheel or wheels, arranged beneath and relatively to the receptacle, as described, of an adjustable bottom, hinged to the front of said receptacle, and actuated by a set screw, united to said bottom, and mounted in bearings attached to the frame of the machine, under the arrangement and for operation substantially as set forth.

3d, Forming the adjustable bottom of the hopper, and the saddles attached to the same, of metal, cast in one piece, as and for the purposes specified.

4th, The employment, in machines such as described, of distributing wheels formed of glass, porcelain, or other silicate, or of metal enameled or coated with a silicate, substantially in the manner and for the purposes shown and set forth.

83,492.—SEWING MACHINE.—Henry J. Hancock, New York city.

I claim the combination of the needle bar slide, I, with its wings, z z, inclined guides or ways, J J', presser foot, K, made capable of independent lift from the cloth, but reciprocating in the direction of the feed, together with the needle bar, from or through a rock shaft or center, i, common to both, substantially as specified.

83,493.—FISHING NET.—Smith Harper, Leipersville, Pa.

I claim a fishing net, constructed as described, longest at the bottom than at the top, and the bottom line small and weak, and provided with bails, substantially as and for the purposes herein set forth.

83,494.—APPLE CORER AND QUARTERER.—John M. Hassam, Mount Vernon, Me.

I claim the combination with the spring plunger, F, cross bar, G, knives, K or Q, and corer, J, of the conveyer, L, and the extended conveyer or spout, N, whereby the cores and the quarters or slices are conducted to separate places of deposit, substantially as described.

83,495.—COMPOSITION FOR THE MANUFACTURE OF BURIAL CASES.—J. R. Hathaway, Westfield, N. Y.

I claim, 1st, The compound herein described, substantially as and for the purpose described.

2d, Burial cases, made either wholly of the compound herein described, or in part of the same, and wood, or other suitable material, as a new article of manufacture, substantially as and for the purpose set forth.

83,496.—ARTIFICIAL LEG.—George B. Head, Albany, N. Y.

I claim, 1st, The bar, J, in combination with the stand, A, connected with the foot by one or more rods, and operated for unlocking the knee joint, substantially as shown and described.

2d, The combination of the bar, A, and the disk joint, b, and its square pivot, with the coiled spring, i, whereby the leg is thrown forward, substantially as described for the purpose specified.

3d, The stop, N, in combination with the bar, J, substantially as and for the purposes set forth.

4th, The combination of the bar, J, and rods, B B', with the stand, A, knee joint and foot, whereby the pressure of the toe or ball of the foot upon the ground, in the act of walking, relieves or unlocks the knee joint, substantially as described, for the purpose specified.

83,497.—TRUCK AND WAGON REACH.—Philip Hicks, Chicago, Ill.

I claim, 1st, The reach made of two wooden parts, A B, connected by a metallic carved splice, consisting of separate plates, P P, or of solid metallic piece, K, the whole arranged substantially as and in the manner herein set forth and specified.

2d, The metallic block, K, constructed and secured to the curved part of the reach or splice, substantially as and for the purpose set forth.

83,498.—TILL ALARM.—Austin D. Hoffman, Minneapolis, assignor to himself and Frank Brewster, Austin, Minn.

I claim, 1st, In combination with the drawer, A, a revolving knob, C, ring, C', rod, D, notched disk, E, and projection, I, the pins, F, lever, G, and bell, H, arranged to operate substantially as described.

2d, The disk, E, constructed with pins, F, substantially as and for the purpose set forth.

3d, The combination of the knob, the adjustable ring, C', shaft, D, and notched wheel, E, with the projection, I, substantially as and for the purpose set forth.

4th, The disk, E and pins, F, so arranged in relation to the lever and bell, that the bell shall be struck when the disk is turned, after a pin has been projected behind it, substantially as and for the purpose set forth.

83,499.—BOX OPENER.—Leonard Holtzscheiter (assignor to A. B. Shipley), Philadelphia, Pa.

I claim the within described instrument, composed of the handle, A, blade, D, and head, C, constructed and arranged as set forth for the purpose specified.

83,500.—HASP LOCK.—M. G. Imbach, Hartford, Conn.

I claim the arrangement of the casing, I, sliding plate, E, spring bolt, D escutcheon, H, latch, A, and staple, C, all constructed and operating substantially as and for the purposes herein set forth.

83,501.—NEEDLE.—Samuel Ivers, New Bedford, Mass.

I claim my improved needle, made substantially as described and represented, that is, with an opening leading out of one side, rather than one end of the eye, and also with an inelastic head at the upper end of the eye, and with an elastic hook, and either an elastic or inelastic abutment, constructed and arranged together substantially in manner and so as to form the eye as hereinbefore explained, the whole being to operate as set forth.

83,502.—DYEING TEXTILE FABRICS WITH ANILINE COLORS.—I. O. Iversen, Madison, Wis.

I claim, 1st, The herein-described mode of treating aniline colors before they are dissolved in the dyeing compound.

2d, The herein described compound of bichromate of potash, alum, and soda-ash, with an aniline color, substantially as and for the purposes set forth.

83,503.—TRAM FOR GAGING MILLSTONES.—Thomas R. James, St. Louis, Mo.

I claim the tram bush, C, constructed as described, bearing the vertical mandrel, D, adjustable arm, E, and screw gage pins, F, when secured to the runner by being wedged into the recess provided for the driver, in such a manner as to step the spindle, D, in the bail, B, of said runner, as herein shown and described.

83,504.—FRUIT BOX.—T. B. Jones, Radnor, Ohio.

I claim a box or basket, constructed with a hinged bottom (which bottom is provided with a bail for dropping and closing the same), for handling fruit and other articles, constructed, arranged, and operating substantially as and for the purposes set forth.

83,505.—STEAM GENERATOR.—Thomas B. Jordan, South Lambeth, England, assignor to B. H. Bartol, Philadelphia, Pa. Patented in England Oct. 28, 1865.

I claim, 1st, The combination of the upright pipes, E, horizontal pipes, B, and a steam chest or reservoir, E, substantially as described.

2d, A generator constructed substantially as described, and having its lower portion embedded in the brick work, substantially as set forth.

3d, The combination with a chamber containing a steam generator, of two or more flues having independent dampers, substantially as set forth.

83,506.—SMOKE-STACK FOR LOCOMOTIVES.—J. A. W. Justi, Savannah, Ga.

I claim, 1st, The gate formed by the rings, K K1, etc., or their equivalent arranged in the ring, G, and under the plate, H, substantially as described and fitted into the smoke-stack of a locomotive, for the purpose of arresting sparks, ashes, etc., as set forth.

2d, The combination within the smoke-stack of a locomotive engine, of the pipe, B, having an enlarged upper end, of the cap, C, ring, D, deflector, E, cap, F, ring, G, plates, K K1, etc., or their equivalents, plate, H, and ring, P, all arranged substantially as herein shown and described.

83,507.—WHEEL PLOW.—James Kay, Salem, Ind.

I claim, 1st, A two-wheel single riding plow, having the plow, E, and its standard, C', secured to a hinged frame, C, as described, in combination with lateral, front, and rear braces, arranged for sustaining said standard, substantially as described.

2d, The brace bar, J, connected to the bar, n, of the plow, E, passed through the standard, C', and secured to the frame, C, substantially as described.

3d, The combination of levers or treadles, e f, with a plow which is applied to a hinged frame, C, upon a two-wheel carriage, one of which levers or treadles is adapted for raising the plow and its frame, while the other is adapted for depressing said parts, substantially as described.

4th, The brace, g, connected to the bracket, d', and the seat standards, c', substantially as and for the purposes described.

5th, The adjusting screw rods, o o, applied to the hinged frame, C, and supporting this frame upon the axle, A', of a single riding plow, substantially as and for the purpose described.

6th, In a machine which is constructed as described, the three holdback rods or chains, p p s, attached to the doubletree, substantially as and for the purposes described.

83,508.—CAR BRAKE.—Peter Keffer (assignor to himself and E. G. Fishburn), Reading, Pa.

I claim a railroad car brake consisting of a yielding wedge shaped frame, C, constructed and operating substantially as herein described, in combination with brake shoes, B and B', hung to the car or truck, substantially as set forth.

83,509.—CULTIVATOR.—J. H. B. Keller, Chambersburg, Pa.

I claim, 1st, The pivoted standards, G, arranged in connection with the rods, J, india-rubber springs, I, and beams, E, all arranged in the manner substantially as and for the purpose set forth.

2d, The levers, K, attached to the beams, E, and arranged in relation with the driver's seat, D, substantially as and for the purpose specified.

83,510.—RAILROAD SWITCH.—Michael Kelly, St. Charles, Mo.

I claim the ings, C C, and guard rails, E E, when arranged relatively to each other as set forth, in combination with switch rails, A, as shown, for the purpose explained.

83,511.—THILL COUPLING.—Wilson W. Knowles, Plantsville, Conn. Antedated Oct. 17, 1868.

I claim the combination and arrangement of the center piece, C, with the eared piece, A, eye piece, B, bolt, E, and nut, F, all arranged, combined, and operating as described.

83,512.—AUTOMATIC CAR COUPLING.—Perley Laflin, Warren, Mass., assignor to himself and John J. Sprague, Providence, R. I.

I claim, 1st, the combination with the draw piece, B, the projecting arm, C, and its slotted standard or upright piece, b, of the hinged or pivoted arm, D, and the prop, G, and toggle pin, E, attached to said arm, substantially in the manner described, the whole being arranged to operate as set forth.

2d, In combination with the parts named in the preceding clause, the rod, H, constructed and arranged to operate in connection with the swinging arm D, substantially as described.

3d, The combination and arrangement with the arms, C and D, of spring, g, and screw, h, substantially in the manner and for the purposes set forth.

83,513.—MACHINE FOR CUTTING PAPER.—Hervey Law, Chatham, N. J.

I claim, 1st, In machines for trimming books the turning of the bed, S, on which the paper is cut, by the receding movement of the bed from the knife, after the completion of each cut, so as to present an uncut side of the pile of paper or books to the knife at each upward movement of the bed, substantially as set forth.

2d, Giving the bed, S, and consequently the paper to be cut, a lateral horizontal movement at the termination of its upward oblique movement, in order to effect a clean cut, substantially as shown and described.

3d, The automatic mechanism, substantially as shown and described, for operating the clutch lever, H, and stopping the machine at the completion of the cutting of the four sides of the paper or piles of books on bed, S, as set forth.

4th, The pendent projections, r r' r'' r''', at the under side of the bed, S, in connection with the projections, s s', on the upper surface of the fixed bed, J, for the purpose of holding the bed, S, in proper position relatively with the knife, C, when the paper is being cut, and also when receding from the knife, and at the same time admit of the bed being turned at the proper moment, substantially as set forth.

5th, The trip on the fixed bed, J, composed of the fixed part, t, the pivoted part, t', and the spring, u, when used in connection with the projections on the beds, S J, and arranged to operate in connection therewith, substantially as and for the purpose set forth.

83,514.—BEEHIVE.—Benjamin Leckrone, Somerset, Ohio.

I claim, 1st, The device for hanging the frames, J J, so that they are independently attachable to or removable from the sliding boxes which support them, such device consisting essentially of the rods, m m, flattened at o, and operating, in connection with the hook, n, and the perforated log, r, substantially as described.

2d, The combination and arrangement of the feed rack, D, and cleaning box, C, substantially as described.

3d, The boxes, F F1 F2 when constructed with the front doors hinged at as, latched at a', having the catches or hooks, d d, by which the slide boards can be attached to them at pleasure, and containing the comb frames, J J, substantially as described.

4th, The arrangement and combination of the ventilating aperture and bee-entrance, c, the foraminated slides, I I, the foraminated plates, H H, and the space, K, between the front of the comb boxes and the wall of the hive, for the purpose of affording a free ventilation to all parts of the hive, whether the bees are confined or free.

5th, The arrangement of the entrance, c, cleaning box, C, feed rack, D, boxes, F F1 F2, comb frames, J J J, windows, G G, ventilators, H H, and door, E, substantially as and for the purpose set forth.

83,515.—GAGE FOR STONE WARE.—A. W. Loomis, Atwater, Ohio.

I claim the adjustable gages, G and F, in combination with the handles, D E, when arranged, in relation to a potter's wheel, in the manner as and for the purpose specified.

83,516.—GOVERNOR FOR STEAM AND OTHER ENGINERY.—Jos. Theodor Lossen, Würzburg, Bavaria.

I claim, 1st, The arrangement of the spur wheel, F, pinion, G, weighted lever, I, and vane arms, L, substantially as shown and described.

2d, The inverted bucket or air shell, M, having an air cock, b, and vessel, N, in combination with the spur wheel, F, pinion, G, weighted lever, I, and vane arms, L, substantially as herein set forth.

83,517.—GRAIN DRILL.—John T. Lynam, Jeffersonville, Ind.

I claim the combination and arrangement of cutters, F, springs, E, and the tubes, D G, all applied to a seed drilling machine, to operate in the manner substantially as and for the purpose set forth.

83,518.—WRINGER ROLLER.—A. Magowan, Boston, Mass.

I claim the elastic roller, having its core formed by winding the square mandrel, A, having radial arms, D, with a string or cord steeped in liquid raw india-rubber, an outer rounding filling, composed of longitudinal strips, E, being interposed between the winding string and mandrel, as herein described, for the purpose specified.

83,519.—CULTIVATOR.—James Mallon, Lockport, Ill.

I claim, 1st, The handles, E, brace, Q, in combination with the bar, 5, pivoted to the under side of the tongue, reciprocating bar, g, braces, P, rods, f, and braces, G', for giving a lateral motion to the shovels, as set forth.

2d, The braces, G G', in combination with bars, F F', shanks, J J', and stirrups, d, substantially as set forth.

3d, The combination of the draft rod, I I, spools, T, bars, F F', cams, V, and lever, X, substantially as set forth.

4th, The hill protector, K, pivoted to the brace, G', and arranged substantially as set forth.

83,520.—HARVESTER.—L. J. McCormick, W. R. Baker, and L. Erpelding (assignors to C. H. McCormick & Brother), Chicago, Ill.

We claim, 1st, The combination, substantially as set forth, in a two-wheeled harvester, of a tongue, with its rear end pivoted laterally in a socket over the main axle, a corrugated laterally slotted bracket on the front of the main frame, a correspondingly corrugated socket on the tongue, and a vertical clamping bolt connecting the socket and bracket, whereby the angle of the tongue to the line of draft can be varied as pleasure.

2d, The shields, S, constructed as described, attached to the main frame, and enclosing the counter shaft, the pinions which drive it, and the backing ratchets, for the purpose set forth.

3d, The arrangement, as set forth, for joint operation, of the counter shaft, the adjustable bevel gear, O, and its sliding clutch, with the nut and removable pinion on the front end of the crank shaft, whereby we vary the speed of the cutters by using a single gear wheel on the counter shaft without moving either shaft.

4th, The arrangement, as described, for joint operation, of the finger beam, the shoe, and the stirrup, with the horn, I, and dog, L, whereby we lift the divider end of the finger beam first in raising the cutters.

5th, The combination, as set forth, of the shoe, H, and arched shield, I, with the roller, provided with wooden bushing.

83,521.—SCHOOL DESK.—John Mealey, Fairville, New Brunswick.

I claim, 1st, The adjustable desk, G H, in combination with the seat, C, and its supports said desk adapted to be folded back, to form a back rest for the seat, substantially as shown and described.

2d, In combination with the adjustable desk, G H, the seat, C, and its supports the hinged back, D, as herein described, for the purpose specified.

83,522.—MACHINE FOR FORMING THE HOOK OR EYE ON POT BAILS, ETC.—Jacob Miller, Washington, Pa.

I claim the disk, c, provided with the mandrel, e, and pin, f, combined with the lever, B, furnished with a forming roller, c, and guide, J, constructed, arranged, and operating as herein described, and for the purpose set forth.

83,523.—MACHINE FOR BENDING OVAL HANDLES FOR TIN WARE.—Jacob Miller, Washington, Pa.

I claim the frame, A, provided with the slots, B and c, pin, J, forms, C, and brace, k, and used in combination with levers, D, provided with rollers, f, constructed, arranged, and operating as herein described, and for the purpose set forth.

83,524.—GAGE FOR CIRCULAR SAWS.—Warren P. Miller, New York city.

I claim the gage for rounding circular saws, consisting of gage point, h, gage rod, g, nut, k, tube, f, plug, c, and curved arms or forks, m m, in connection with grooved collar, b, all constructed, combined, and arranged substantially as and for the purpose specified.

83,525.—BOLT CUTTER.—Thomas W. Moore, Richmond, Ind

I claim the arrangement of the shear blades, levers, and swivel pivot pins in the manner described and for the purpose set forth.

83,526.—WASTE SAVER FOR CARDING ENGINE.—Charles F. Morrison, Ritton Glen, N. Y.

I claim, 1st, The described arrangement of the horizontal waste carriers, E F, with relation to the doffer, D, cylinder, C, feed rollers, B B', and stripping roller, G, as herein described, for the purpose specified.

2d, The horizontal waste carriers, E F, constructed as described, of small wire ribs, widely spaced upon the belts, and adapted to be shaken, in the manner described, for the purpose specified.

83,527.—STEAM GENERATOR.—E. P. Mosman, deceased (Albert S. Bolles, and Sarah E. Mosman, administrators), Norwich, Conn.

I claim, 1st, An evaporizer for a steam boiler, consisting of a case or shell, H, with an inclosed diaphragm, I, arranged within it, substantially as described.

2d, The combination of short flue boiler sections and evaporizers, constructed, arranged, and communicating with each other, substantially as described.

3d, A feed water heating chamber, combined with a short flue boiler section or sections, substantially as described.

4th, The manner, substantially as shown and described, of conducting the water from a chamber, j, horizontally over the fire chamber, and thence vertically through said fire chamber.

83,528.—STEAM GENERATOR.—T. H. Muller, New York city.

I claim, 1st, The heads, E, provided with openings, a, in their sides, and openings, b, in their tops, placed eccentrically toward the center lines of the pipes, D, substantially as shown and described.

2d, The perforated tubular brackets, n, through which bolts, m, pass, arranged with relation to water jacket, F, and heads, E, substantially as set forth.

3d, The water chambers, c d e f, communicating with the heads, E, and inclosing the pipes, D, substantially as shown and described.

83,529.—COMPOSITION FOR FORMING TILES, FLOOKS, AND FOR OTHER PURPOSES.—Joseph Neubrand, Green Point, N. Y.

I claim the combination of the within described articles for the purpose specified.

83,530.—TWEER.—O. G. Newton, Edinburg, Mo.

I claim the combination of those parts with the adjustable bearing for the shafts, G, as arranged and described.

83,531.—PAPER FILE.—Baruh Ney, and Henry Hofheimer, Alexandria, Va.

We claim the paper file, A, provided with an outer supporting edge, A', counterbalanced by the advertising frames, E, arranged and combined substantially as shown.

83,532.—BEE HIVE.—Abner Niebel, Tiffin, Ohio.

I claim, 1st, The feed box, A, constructed as described, in compartments, with wire cloth top, door, and ventilating holes, and provided with dirt drawers, B B, and sides, c c, and with blocks, c c, covering the openings, b b, substantially as and for the purposes herein set forth.

2d, The combination of the feed box, A, chambers, D D, honey boxes, E

E, and cap, H, all constructed as described, and operating substantially as and for the purposes herein set forth.

83,533.—APPARATUS FOR PRESERVING AND FREEZING FISH, MEATS, ETC.—Philip Nunan, Sandusky, Ohio.

I claim, in a meat and fish preserving house, having compartments, B B, with walls, as herein described, the combination of the vessel, C, pipes, D and E, and vessels, F F F, all suspended in the house, so as to allow a space below them, for the articles, substantially as herein shown and described.

83,534.—BAG FASTENER.—Charles H. Nye, Vineland, N.J.

I claim the described arrangement of the handle, D, buckle, B, and strap, A, secured to the bag, for the purpose specified.

83,535.—WASHING MACHINE.—E. F. O'Neill, Prairie du Chien, Wis.

I claim the combination of the bow lever, D, board, I, apron or flange, J, arms or bars, G, and three or more corrugated rollers, H, with each other, and with the tub, A, and cylinder, B, substantially as herein shown and described, and for the purpose set forth.

83,536.—SEAT BACK.—W. H. Paige (assignor to himself, John Sweeny, and James W. Russell), Springfield, Mass.

I claim the metallic springs, b b, attached to the body or frame, A, the ends of said springs having a bearing in the channels, a or a', with the screws, s, or other protruberances therein, the whole, when covered and stuffed, forming a seat back, all constructed and operating substantially as herein described and set forth.

83,537.—CORN PLOW.—Clinton J. Paine, Young America, assignor to himself and Henry Creswell, Warren County, Ill.

I claim, 1st, The curved draft bar, B, running from the inside of the center of the wheels forward and upward, substantially as and for the purposes herein set forth.

2d, The arrangement of the curved plow beams, F F, coupled to the curved draft bar, B, as and for the purposes herein set forth.

3d, The bar, E, running from the outside of the center of the wheels, and across the top, as and for the purposes herein set forth.

4th, The combination of the forked ends, a a, of the plow beams, and the pins, b b, and plates, c c, forming a hinged coupling, substantially as and for the purposes herein set forth.

83,538.—KNIFE AND FORK HOLDER.—John W. Patten, North Greenbush, N.Y.

I claim, 1st, The longitudinally supporting device, A, mounted on a standard or standards, B B, which extend up from a rod, C, substantially in the manner and for the purpose described.

2d, The combination of the longitudinal supporting device, A, standards, B B, rod, C, and spring clamp or clamps, D D, substantially in the manner described.

3d, The rod, C, with clamp screws, a, fitted to the standards of supporting device, A, substantially as described.

83,539.—ROOFING COMPOUND.—M. Pinner, Buffalo, N. Y.

I claim a cement composed of the ingredients above specified, in substantially the proportions and for the purposes set forth.

63,540.—APPARATUS FOR SHUFFLING AND DEALING CARDS.—Honoré Etienne Poquet, Sartrouville, France.

I claim, 1st, The transverse metal wires, H, in combination with the box, A, substantially as and for the purpose set forth.

2d, The combination of the clock movement with the distributing roller, J, the spring, D, the platform, D1, and the pin, F G, constructed and operating substantially as and for the purpose described.

3d, The platform, D1, in combination with the spring, D, the pin, F G, and distributing roller, J, constructed and operating as and for the purpose set forth.

83,541.—CHAIR SEAT.—Cornelius Platt, New Haven, Conn.

I claim the chair seating herein described, as an article of manufacture, consisting of the compound foundation, a and b, covered, and so as to be applied to the chair frame, substantially in the manner herein set forth.

83,542.—FURNACE FOR THE MANUFACTURE OF IRON AND STEEL.—Auguste Ponsard, Paris, France.

I claim a furnace for the manufacture of iron and steel, constructed substantially as specified, and provided or fitted with tubes or ore, carbon and flux receptacles, S S, in communication at their base with the basin, D, of the furnace, essentially as shown and described.

83,543.—FEED WATER HEATER.—Louis B. Powelson, Pittsburg, Pa.

I claim not any of the specified parts in severalty, but an improved feed water apparatus, consisting of the several part specified, all combined, constructed, and arranged as described.

83,544.—BED LOUNGE.—James D. Pratt, Cleveland, Ohio.

I claim so arranging the springs, E and F, on the flat horizontal bars, C and D, that the middle of the entire space of the bed shall present a soft and elastic surface, substantially as shown and described.

83,545.—PHOTOGRAPHIC ROOM.—George K. Proctor, Salem, Mass.

I claim 1st, For photographing purposes, an apartment or room, having its interior of such a curved form as to reflect and concentrate the rays from a lamp, or other light, upon the person or object to be photographed, substantially shown and described.

2d, The opening, c, in the room or apartment, A, for the purpose of adjusting the camera outside of the room in proper position with the person or object to be photographed within the room or apartment, substantially as set forth.

3d, The employment of magnesium, when used for illuminating purposes, in connection with a room or apartment, A, constructed in the manner or form as shown, and for the purpose specified.

83,546.—THILL COUPLING.—Robert Pyle, Wilmington, Del.

I claim, 1st, The die, as constructed, in combination with the bolt and washers, as shown and described.

2d, The combination of the die, a, and screw bolt, c, with the clip iron, k, tie iron, f, and thill iron, with an eye or hooked end, constructed and operating in the manner and for the purpose substantially as herein shown and described.

83,547.—ROAD GRADER.—James M. Ragsdale, McCoy's Station, Ind.

I claim, 1st, The arrangement of the wheel, F, plow, R, and revolving arms, H H, when connected with the frame, A, and constructed and operating, substantially as specified.

2d, The combination of the hinged axle, B', and lever, K, with the frame, A, provided with the wheel, E plow, R, and arms, H H, and connected to operate as set forth.

83,548.—PHOTOGRAPHIC PRINTING FRAMES.—Byron Reed, Kokomo, Ind.

I claim, 1st, Placing an indefinite number of papers, prepared for receiving photographic impressions from a negative, in a frame at one time, substantially in the manner herein shown and described.

2d, The frame, A, constructed substantially as described and arranged for receiving a large or a small number of papers, substantially as set forth.

83,549.—STEAM PUMP.—A. J. Reynolds, Chicago, Ill.

I claim, 1st, A water elevating engine, having two cylinders, arranged one upon the other, the upper one for receiving the steam, which aids in expelling the water therefrom, and which by means of its condensation, causes a vacuum to be created therein, and another, into which the steam from the latter is caused to flow by the discharge of the water from the former, and in which the steam from the upper cylinder is condensed, substantially as described.

2d, The combination of cylinders, A and B, and float or piston, M, with its apertures or passages, O, substantially as described.

3d, The combination of the float or piston, M, and valve, P, substantially as set forth.

4th, The combination of the rod, E, float, M, valves, P Q and X, substantially as described.

5th, The combination and arrangement of valves Q and X, on rod, E, and valve, W, in the head of cylinder, A, substantially as set forth.

6th, The arrangement of valve, H, in relation and with reference to valves, X and W, substantially as set forth.

83,550.—GATE.—John F. Rogers, South Bend, Ind.

I claim a gate, constructed as described, having the rail, a, for sustaining the lateral pressure, placed at the bottom of the gate, in combination with the short post, D, the rollers, A, their supporting posts, E, and connecting bar, A', and posts, E', all constructed and arranged, as and for the purpose set forth.

83,551.—FURNACE FOR THE MANUFACTURE OF IRON AND FOR OTHER PURPOSES.—Henderson Ross, Pittsburg, Pa. Antedated September, 30, 1868.

I claim so constructing the fire chamber of furnaces used in the manufacture of iron and steel, that the interior walls of said chamber shall consist of iron, which are surrounded with water, substantially as herein described, for the purpose set forth.

83,552.—WATER-HEATING APPARATUS.—John C. Ryan, Chicago, Ill.

I claim the combination of the pipes, E D L C, with the boiler, A, stove, S, and coil, B, whereby the circulation of water is effected, as above described, and at the same time the steam is taken from the pipe, D, or vessel, A, and conveyed to the heater, H, as herein set forth for the purpose specified.

83,553.—HOT-WATER HEATER.—George H. Sellers, Phœnixville, Pa.

I claim, in combination with the external water chamber, C, the cylindro-conical fire chamber, A, as and for the purpose substantially as described.

Also, in a hot-water heater, the immediate connection of the water chamber with the street mains, so as to avoid the necessity of a reservoir, substantially as described.

83,554.—SCREW CUTTING LATHE.—H. F. Shaw, West Roxbury, Mass.

I claim the arrangement, substantially as described, of the lever, L, pivoted at L', the nut, N, having a slotted shank, N', thereon, the adjustable connecting button, K, carriage, G', pivoted with the swiveled and slotted disk, H, and the screw, F, or their equivalents, for the purpose described.

83,555.—FASTENING FOR CARRIAGE CURTAINS.—Ephraim Shepard, New York city.

I claim the tube, B, slotted substantially as shown, to form a spring, b, in combination with the eye, E, in the curtain, D, all constructed and arranged to form a new and improved curtain fastening, as set forth.

83,556.—RAILWAY CATTLE GUARD.—D. B. Shirk, Brunnerville, Pa.

I claim the arrangement of the crank, c c', when not in the same plane, on the top of a shaft, which shaft is provided with pickets, P, and a central weight, W, appended below, and when operated by a hinged lever, L, with its open jaws, J, the lever being pivoted at one end, all combined and operating substantially in the manner and for the purpose specified.

83,557.—LOOM.—A. W. Silvis (assignor to himself and S. B. Shotz), Birmingham, Iowa.

I claim, 1st, The arrangement of the picker staff, a, with its enlarged lower end notched as a2, the swinging reversing pawl, a1, provided at its enlarged lower end with double inclines, the hinged spring hooks, a3, and the bridge, a5, all operating as described for the purpose specified.

2d, The arrangement of the pawl, b'', bracket, b1, secured to the lay, the pattern cylinder, b2, catch pawl, b3, and pivoted right-angular harness levers b3, all constructed as herein described for the purpose specified.

3d, The combination of the right angled harness levers, b5, with the harness frames and pattern cylinder, substantially as and for the purpose set forth.

83,558.—JACK FOR TURNING SHAFTING.—Alfred Sims, Brooklyn, N. Y.

I claim the lever pawl, C D, and jack, E, in combination with the ratchet wheel, B, mounted on the shaft, A, substantially as and for the purpose described.

83,559.—SHUTTLE FOR LOOMS.—C. E. Smith and F. T. Jaques, Lowell, Mass.

We claim the twisted shank, C, provided with the removable tip, B, constructed substantially as shown and described, in combination with a shuttle.

83,560.—TOOL FOR TURNING AND PLANING.—J. P. Smith, Glasgow, Scotland.

I claim the within-described formation and adaptation of the under surface of the part, c, to fit tightly and firmly to the properly curved surface of the tool, b, the curvature of each being uniform through the whole length, by rolling, molding, or otherwise, the part, c, and the tool, b, being used, in combination with the part, a, substantially as and for the purposes herein set forth.

83,561.—HAY RACK.—Wilson Smith, Tod Township, Ohio.

I claim, 1st, The rack, composed of side pieces, a and d, and the rungs or cross pieces, b b b, when applied to managers, by hinging or attaching it to the top of said manger, and at the side next to the animal that feeds therefrom substantially as shown and described.

2d, The combination of manger, g, the rack, a b b d, and feed trough or troughs, f f, all as shown and described.

83,562.—HAT HOOK.—C. L. Spencer, Providence, R. I.

I claim the combination of the hook, strap, and tongs, when constructed to operate substantially as set forth and for the purpose specified.

83,563.—STATION INDICATOR.—Elihu Spencer, Ottawa, Canada.

I claim, 1st, The cutting out or otherwise constructing the plates, c, so as to form frames, over or on which a transparent or semi-transparent fabric, d, is secured, having the names of the stations upon them, in combination with a candle, lamp, or other light, D, placed at one end of the box, A, and arranged so as to throw the rays of light within the same, substantially as and for the purpose specified.

2d, The adjustable or sliding bar or stop, E, arranged and applied in the manner substantially as and for the purpose set forth.

3d, The bell-operating mechanism, composed of the lever, K', spring, I, right-angular plates, H H, and hammers, G G, all arranged to operate by the turning of the heads, B, substantially as and for the purpose specified.

4th, The flaps, L, when applied to the box, A, and used in connection with the drop catch, M, substantially as and for the purpose specified.

83,564.—CULTIVATOR.—W. H. Stratzman, Big Lick, Va.

I claim the arrangement of the standards, B B, oblique bar, C, rack bar, I, and keeper, K, with nuts, g, and plows, D, all as herein set forth.

83,565.—BEEHIVE.—L. M. Stoops, Grandview, Ind.

I claim 1st, The perforated tube, B, placed in the bottom of the hive, at its front side, and provided with the entrance, F, all substantially as shown and described.

2d, The ventilating tube, G, provided with openings to admit air through the sides of the hive, and other openings leading into the brood chambers and honey boxes, substantially as herein set forth.

3d, The arrangement of the brood chambers, C C, ventilating tube, G, feed box, H, and honey boxes, I I, all constructed substantially as and for the purposes herein set forth.

83,566.—WASH BOILER.—Jerome B. Sweetland, Pontiac, Mich.

I claim, 1st, The reversed bottom, B, provided with a rim, C, projecting downwards, and said rim provided with openings, covered on the inside with valves, D D, substantially as and for the purposes herein set forth.

2d, The removable cone-shaped tube, E, secured to the reversed bottom, B, by means of the notched flange, c, and keys, d d, or its equivalents, and provided at the top with a grooved flange, e, on which is placed the cap, F, with its lugs, f f, forming a loose joint, substantially as and for the purposes herein set forth.

3d, The reversed bottom, B, provided with a partition or wall, J, and hinged pallet or valve, L, the latter extending up into the tube, E, substantially as and for the purposes herein set forth.

83,567.—CORN PLANTER.—C. W. Thiessen, Effingham, Ill.

I claim, 1st, The drop-box, constructed as described, of the parallel ribs, d, d, one of which is provided within the seed receptacles, l m, as herein set forth and shown.

2d, The circular seed receptacle, E, constructed as described, and secured to the inner face of the wheel, B, within the flange, c, as herein set forth and shown.

3d, Pivoting the connecting rods, j, of the slides, g, by means of a common pin, K, to the stationary axle of the revolving wheel, so that, by the revolution of the wheel, the slides will receive reciprocating motion in the drop boxes, substantially as set forth.

4th, The arrangement of the circular seed receptacle, E, and slides, g, upon opposite sides of the wheel, B, as herein described, for the purpose specified.

83,568.—HARVESTER.—James Toay, Mineral Point, Wis.

I claim, 1st, The wheel, A, constructed substantially as shown and described.

2d, The plate, B, constructed substantially as shown and described.

3d, The combination of wheel, A, plate, B, and the framework of a harvesting machine, substantially as shown and described.

83,569.—CULTIVATOR.—P. R. Totten Adams, Ill.

I claim, 1st, The bow shaped lever, K, in connection with the treadle, L, combined and arranged substantially as and for the purpose specified.

2d, The connecting of the bow-arms, G G, of the inner plows, H, by means of staples passing through oblong slots, e, to admit of the lateral movement of said plows, substantially as set forth.

83,570.—HASP FOR TRUNK LOCKS.—Leonhardt Uitting (assignor to himself, G. Massa, Ch. Ammlung, and H. Zimmerman), Philadelphia, Pa.

I claim hinging the swinging hasp, B, to the upper edge of its plate, b''', so that it can be freely turned sufficiently upward to allow the plate, b''', to be fastened to the trunk-lid by rivets, b5, which will be covered by the said hasp when the trunk is closed and locked, substantially as and for the purpose set forth and described.

83,571.—FODDER CUTTER.—Elias F. Varner, Harveysburg, Ohio.

I claim, 1st, The provision, in a fodder cutter, of the knife, N, having one cimeter cutting edge, n, and one hooked cutting edge, n', and being furnished with a slotted shank, O o, or its equivalent, for attachment to a driving shaft, in the manner herein described.

2d, The combination and arrangement, substantially as described herein, of the feed rollers, C C', springs, D, ratchet wheels, c c', pivoted feed hands, E E' e e', cross head, F, reciprocating bar, G, spring, H, adjustable cam, I I, driving shaft, J, and fly wheel, K, for the object explained.

3d, In combination with the knife, N n n', driving shaft, J, nut, L, and washer, l, for the purpose described.

83,572.—DOOR HINGE.—Anton W. Walter, Canton, Ohio.

I claim, 1st, A hinge, composed of two leaves, having eyes or lips turned up at their outer or inner edges, and combined with a hinge pin, substantially in the manner and for the purpose herein specified.

2d, In combination with a hinge, constructed as herein specified, a spiral spring, F, arranged and used substantially in the manner and for the purpose specified.

83,573.—TURNING TOOL.—William H. Whitlock, Rising Sun, Ind.

I claim the hand tool for turning, herein described, composed of the stock, A a a' a'', bit or cutter, B b b' b'', set screws, C C', and handle, D.

83,574.—GRIST MILL.—Bennett Whitney, New Brunswick, N. J.

I claim, 1st, The arrangement of the elastic packing, H, interposed between the upper stone, E, and the curb, C, substantially as and for the purpose set forth.

2d, In combination with the stone, E, the pins, h, slotted sliding bars, I, slotted plate, g, adjustable plate, L, stationary screw, i, and nut, j, all operating as described, for the purpose of adjustably suspending the stone, E, in framing, as herein shown and described.

3d, The reversible Z-shaped bars, M, when provided with hooks, l, arranged to support the hopper and shoe of the grist mill, as herein described.

83,575.—PREPARATION OF ROOFING FABRICS.—Jay J. Wiggin, Syracuse, N. Y.

I claim, 1st, The box or bed, C, constructed as and for the purpose described.

2d, The three rollers, B B B, constructed and arranged substantially as and for the purpose described.

3d, The rolling apparatus composed of the three rollers, B B B, the frame, A A, and the parts contained in the same, constructed and arranged substantially as and for the purposes set forth and described.

4th, The heating and keeping hot the rollers, B B B, by the production into them of either hot water or steam, substantially in the manner set forth.

5th, The process herein described, of coating felt, paper, and other roofing fabrics, the same consisting in the use of heated rollers acting over a clay bed, or its equivalents, constructed substantially as described.

83,576.—ROOFING COMPOSITION FOR HOUSES, BOATS, BARNS, ETC.—Jay J. Wiggin, Syracuse, N. Y.

I claim the compound made of the ingredients before described, in the proportions above set forth, substantially as and for the purpose described.

83,577.—COMBINED TOOLS.—John D. Wilkinson and E. O. Boyle, Plattsburg, N. Y.

I claim, combining and securing or pivoting the wire gage, A, dividers, C, rule, D, square, E, and calipers, F and H, together, when made to correspond in dimensions with each other, as and for the purpose set forth.

83,578.—HARVESTER.—Miletus J. Wine, Long Glade, Va.

I claim, 1st, The chute, M, having its rear end left open, and attached only to the outer bar at its front end, when arranged between the grain wheel, W, and the apron, and below the level of the latter, in the manner and for the purpose specified.

2d, In connection with the belt, C, for moving the apron, A, and the chute, M, for receiving the grain from said apron, the rock shaft, G, the rake, J, the idle pulley, N, and the treadle, t, or arm, z, when combined and arranged to operate in the manner and for the purposes substantially as specified.

83,579.—WATER WHEEL.—A. N. Wolf, Sheridan, and Joel Haag, Bernville, Pa.

We claim the combination of the casing, A, wheel, E, chutes, B B, hinged gates, C C, and ring, a, all constructed, arranged, and operated substantially as set forth.

83,580.—REGISTERING SCALE.—David Wolf, Easton, Kansas.

I claim the arrangement of the dial plate, E, pawl, f, shaft, C, wheel, D, with its pin, g, and waist pin, d, the hammer, J, and bell, k, as constructed, in combination with the beam, A, to be operated by a platform or weighing scale, substantially in the manner as described, for the purposes herein set forth.

83,581.—STOP FOR UMBRELLA RUNNER.—Joseph Wright, Philadelphia, Pa.

I claim a stop for umbrella runners consisting of a staple having legs, a a1, of different lengths, and a shoulder, a2, substantially as described.

83,582.—EXTRACTING GOLD AND SILVER FROM THEIR ORES.—John W. Kidwell, Washington, D. C.

I claim the use of finely divided iron, prepared according to Bischoff's patent process, in connection with the amalgamation of gold and silver ores, as herein described and set forth.

REISSUES.

34,150.—WATER WHEEL.—Dated Jan. 14, 1862; reissue 1,791, dated Oct. 11, 1864; reissue 3,163.—Division A.—James S. Goode and John W. Bookwalter, Springfield, Ohio, executors of the estate of James Leffel, deceased.

We claim, 1st, A wheel having two series of buckets, both receiving the water horizontally, and one series discharging the water vertically and the other toward the center, substantially as described.

2d, The annular diaphragm, D, constructed and arranged to operate in combination with the buckets above and below, substantially in the manner and for the purpose set forth.

34,150.—WATER WHEEL.—Dated January 14, 1862; reissue 1,791, dated October 11, 1864; reissue 3,169.—Division B.—James S. Goode and John W. Bookwalter, Springfield, Ohio, executors of the estate of James Leffel, deceased.

We claim, in combination with a water wheel having two series of buckets, an upper plate, covering the wheel, with a horizontal flange, and a lower cylinder and flange, and a series of chutes for directing the water to said buckets, substantially as described.

34,150.—CASE FOR WATER WHEELS.—Dated January 14, 1862; reissue 1,792, dated October 11, 1864; reissue 3,170.—Division A.—Jas. S. Goode and John W. Bookwalter, Springfield, Ohio, executors of the estate of James Leffel, deceased.

We claim, 1st, A case for a water wheel, composed substantially of a crown plate, A, with a horizontal flange, c, projecting beyond the periphery of the wheel, a cylinder, R, with a correspondingly projecting flange, e, and a series of oscillating gates, placed intermediately between the flanges, substantially as described.

2d, In combination with a case, substantially such as described, an upper and lower support for the water wheel shaft, attached to the case, substantially as described.

3d, The upper plate, A, when constructed with the flange, c, cut away to admit of the movement or oscillation of the gate plates, substantially as described.

4th, The bolts that hold the crown plate and cylinder by their flanges, in proper position, in combination with the case, and the means for sustaining the wheel, substantially as described.

34,150.—GATE FOR WATER WHEELS.—Dated January 14, 1862; reissue 1,792, dated October 11, 1864; reissue 3,171.—Division B.—Jas. S. Goode and John W. Bookwalter, Springfield, Ohio, executors of the estate of James Leffel, deceased.

We claim, 1st, The gates, H, when constructed substantially as described, so arranged around the wheel as to form converging throats, and so pivoted that when closed there shall be an equilibrium of pressure on the opposite ends thereof, substantially as set forth.

2d, Gates, H, which have their faces from, z'' to z', outwardly flaring, and their faces from, z' to z, when closed, on a curve concentric with the wheel, and pivoted to flanges c and e, at a point, d, in the middle of the latter faces, substantially as set forth.

72,323.—LIFTING APPARATUS FOR GRAIN DRILLS.—Dated December 17, 1867; reissue 3,172.—Chas. E. Patric, Macedon, N. Y.

I claim, 1st, The employment of the racks, R, and pinions, w, in connection with the hand lever, F, and shaft, H, for the purposes set forth, whether the lifting chains are made to wind upon the shaft or not.

2d, The arrangement of the locking latch, D, with the shaft, H, when it is also made to act as a support, substantially as and for the purposes set forth.

3d, The arrangement of the guards, G, with the rack, R, and pinions, w, substantially in the manner herein shown and described, and for the purposes set forth.

4th, The combination of the shaft, H, with the devices for raising the same, when constructed in such a manner that, by turning the shaft on its axis, it is caused to rise and fall, for the purpose set forth.

66,904.—COMBINED PLANTER, HARROW, AND CULTIVATOR.—Dated July 16, 1867; reissue 3,173.—Peter P. Runyon, Johnson Letson, George J. Janeway, and J. E. McDonald, New Brunswick, N. J., assignees by mesne assignments, of David D. Stelle.

We claim, 1st, The employment, in combination with the main frame and driving wheels, of a rotatory cultivator, or harrow, arranged forward of the main axle, and in a vibratory frame hung on said axle, substantially as described, for the purposes set forth.

2d, The employment, in combination with the oscillating frame, in which the cultivator is hung, of a lever, u, and retaining bar, j, or the equivalents, for depressing the rear end of said frame, so arranged that it may be conveniently handled by the driver while in his seat, as described.

3d, The combination of the rod, k, spring, n, and vibratory valve arm, m, with the cam, i, the whole arranged to operate as and for the purpose set forth.

4th, The adjustable slides, and series of slots in tube, p, for varying the charge of seed to be deposited each time, as and for the purposes set forth.

5th, The adaptation to the same transverse cultivator shaft, g, of different sets of removable harrows and hoes, as described.

74,077.—WEATHER STRIP.—Dated February 4, 1868; reissue 3,174.—E. S. Torrey and J. Torrey, New York city, assignees of Washington L. Gilroy.

We claim, 1st, The insertion of a flat, elastic strip into a molding, such as above described, in an inclined position to its surface, as herein set forth.

2d, Also, affixing said elastic medium into the groove in the rigid molding, by means of suitable cement, as and for the purposes specified.

14,368.—METHOD OF BOTTLING FLUIDS UNDER GASEOUS PRESSURE.—Paul Schmit, New York city, assignee of Jane Quantin and H. A. Pintard, and administrators of Alphonse Quantin, deceased. Dated March 4, 1856; reissue 3,175.

I claim, 1st, The above-described device for filling bottles or other vessels with aerated water and syrup, consisting of conduits or passages, A and R, a syrup-measuring chamber, and a discharging nozzle, or their equivalents, so arranged that the water and syrup may be discharged from said nozzles common to both, substantially as shown and described.

2d, The combination and arrangement of the syrup-measuring chamber, and a cock or valve for admitting the aerated water thereto, substantially as shown and described.

3d, The arrangement of the syrup conduit and the water conduit, as a consequence of which the syrup is expelled from its conduit, such syrup is mingled with the water at some distance from their common outlet, substantially as shown and described.

4th, The combination and arrangement of a valve or cock for drawing the water, a vessel for receiving and dispensing the syrup, and the pipe or passage connecting the same, as a consequence of which the ejection of the syrup is accomplished by the manipulation of the valve or cock for drawing the water, substantially as shown and described.

5th, The construction and arrangement of the vent opening and closing device, and the water-drawing valve or cock, as a consequence of which they are both operated simultaneously by the movement of water-drawing valve, substantially as shown and described.

18,752.—COFFEE POT.—George R. Chittenden, Chicago, Ill., and C. A. Smith, Milwaukee, Wis., assignees of J. McGregor, Jr. Dated April 11, 1854; extended seven years; reissue 3,176.

We claim, 1st, A tea or coffee pot, when made with two receptacles, one for tea or coffee, and the other for water, substantially as described.

2d, A tea or coffee pot, so arranged that the heat shall be communicated to the tea or coffee through a water or liquid medium, substantially as described.

Inventions Patented in England by Americans.

[Compiled from the "Journal of the Commissioners of Patents."]

PROVISIONAL PROTECTION FOR SIX MONTHS.

2,745.—MANUFACTURING GAS.—Jas. Stratton, Philadelphia, Pa. Sept. 5, 1868.

2,795.—CONDENSING APPARATUS FOR STEAM ENGINES.—Franklin Ransom, Buffalo, N. Y. Sept. 10, 1868.

2,797.—MODE OF CONSTRUCTING BEAMS AND GIRDERS.—O. Coffeen Evans, United States. Sept. 11, 1868.

2,815.—MACHINERY FOR MANUFACTURING BRUSHES.—Joseph Sheldon, New Haven, Conn. Sept. 12, 1868.

2,831.—STEAM PUMPING ENGINES.—James R. Maxwell and Ezra Cope, Cincinnati, Ohio. Sept. 15, 1868.

2,833.—TOY.—Wm. W. Rose, New York city. Sept. 15, 1868.

2,839.—MACHINE FOR HULLING AND CLEANING GRAIN.—Jas. F. B. Marshall and Augustus Jones, Boston, Mass. Sept. 15, 1868.

2,842.—COVERING FOR WALLS AND OTHER SURFACES.—Frederick W. Armstrong, Plainfield, N. J. Sept. 16, 1868.

2,846.—APPARATUS FOR PRESERVING FOOD, ETC.—Charles Havard and Manuel X. Harmony, New York city. Sept. 16, 1868.

2,859.—MANUFACTURE OF HEADS FOR DOLLS.—Geo. H. Hawkins, New York city. Sept. 16, 1868.

2,863.—APPARATUS FOR RAISING FLUIDS.—Henry C. Sergeant, New York city. Sept. 17, 1868.

2,865.—EXPLOSIVE COMPOUND.—Joseph Hafenegger, San Francisco, Cal. Sept. 17, 1868.

2,885.—WRINGING MACHINE.—C. H. Hudson, New York city. Sept. 18, 1868.

2,947.—ADHESIVE STAMP.—A. C. Fletcher, New York city. Sept. 25, 1868.

3,007.—TUFTED OR PILE FABRICS, AND MACHINERY FOR MANUFACTURING THE SAME.—John T. Waring, Yonkers, N. Y. Oct. 1, 1868.

RECEIPTS.—When money is paid at the office for subscriptions, a receipt for it will be given, but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona-fide* acknowledgment of their funds.

CITY SUBSCRIBERS.—The SCIENTIFIC AMERICAN will be delivered in every part of the city at $4 a year. Single copies for sale at all the News Stands in this city, Brooklyn, Jersey City, and Williamsburg, and by most of the News Dealers in the United States.

Advertisements.

The value of the SCIENTIFIC AMERICAN *as an advertising medium cannot be over-estimated. Its circulation is ten times greater than that of any similar journal now published. It goes into all the States and Territories, and is read in all the principal libraries and reading rooms of the world. We invite the attention of those who wish to make their business known to the annexed rates. A business man wants something more than to see his advertisement in a printed newspaper. He wants circulation. If it is worth 25 cents per line to advertise in a paper of three thousand circulation, it is worth $2.50 per line to advertise in one of thirty thousand.*

RATES OF ADVERTISING.

Back Page.....$1.00 *a line.*
Inside Page.....75 *cents a line.*

Engravings may head advertisements at the same rate per line, by measurement, as the letter press.

CINCINNATI BRASS WORKS.—Engine Builders' and Steam Fitters' Brass Goods. 10 26

RUST'S Boiler-Plate Hand Punches price reduced. S. C. HILLS, 12 Platt st., New York. 20 6eow

PATENTED WOOD BENDERS. Address JOHN C. MORRIS, 20 3 No. 122 East 2d street, Cincinnati, Ohio.

THE Best Small Lathe Dog in the world. Carries from ¼ to 1 inch. Price $1 Address AMERICAN TWIST DRILL CO., Woonsocket R. I. 20 tf eow

SITUATION WANTED—By a Constructing Engineer, to take charge of Manufacturing, conduct Sale of Machinery, or superintend some Engineering enterprise. Best of references. Address Engineer, Box 3,421 New York. 1*

OUR STEAM BOILER-FEEDING Pumps, Fire Pumps, Pumps for Railroad Stations, Rolling Mills, Breweries, Distilleries, etc., the Public is assured, will be kept fully up to the standard, which three years' test recommends. Price list sent on application. 20 COPE & CO., 118 E. 2d st., Cincinnati, O.

Knap F't Pitt Foundry,
PITTSBURGH, Pa.—Ordnance, Engines, Rolling-mill Machinery, Hydraulic Presses, and Castings generally. 20 13 J. M. KNAP.

THE
Eclipse Steam Pump
Overcomes the disadvantages of all others. It has the only balance valve made; can be moved as easily at 150 as 5 lbs; is simple, cheap, easily packed, and kept in order, and is unequaled for mining and other purposes. 20 13 PHILLIPS & CLULEYS, Pittsburgh, Pa.

THE
Giroud Steam Gage.
Reliable, Strong, Accurate, and Cheap.—Report of Commission on Life Saving Inventions:—"This instrument is a very well constructed Spring Gage, and cannot fail to be accurate as any submitted to the Commission for examination and test." For sale (at lowest discounts) by Giroud M'f'g Co., 191 Lewis st.; Felix Campbell, 79 John st.; and H. J. Davison, 77 Liberty st. 2* 1*

WROUGHT IRON
Beams and Girders.
THE Union Iron Mills, Pittsburgh, Pa. The attention of Engineers and Architects is called to our improved Wrought-Iron Beams and Girders (patented), in which the compound welds between the stem and flanges, which have proved so objectionable in the old mode of manufacturing, are entirely avoided, we are prepared to furnish all sizes at terms as favorable as can be obtained elsewhere. For descriptive lithograph address the Union Iron Mills, Pittsburgh, Pa. 20 13

DUQUESNE IRON AND STEEL WORKS
Coleman, Rahm & Co.,
MANUFACTURERS OF
Iron, Nails, and Steel, Carriage and Wagon Springs and Axles.

Duquesne, XL, and Juniata Merchant Bar, Round and Square Iron; Band, Hoop, Sheet, and Plate Iron; Oval, Half-Oval, and Half Round Iron; Cylinder and Wagon Box Iron; Drag and Dropper Bars; T and Flat Rail for Coal Roads; Cut Nails and Spikes, Plow Spring and A B Steel Laminated Steel; Cutter Bars; Crow Bars, etc., etc. Office and Warehouse—77 WATER ST., Pittsburgh.

WOODWORTH IMPROVED PLANing and Matching Machines, and all other First-class Woodworking Machinery. Address Postoffice Box 5567. 19 4 HAMPSON & COPELAND, Warerooms 89 Liberty st., New York.

THE SHAW & JUSTICE
HAMMER
Is the best one driven by a belt in the market. All sizes for all kinds of work. Send for circular PHILIP S. JUSTICE, 19 4 43 Cliff st., N. Y., 14 North 5th st., Philadelphia.

WANTED—An Agent in each town to take the agency for the sale of Bradstreet's Rubber Molding and Weather Strips, applied to the sides, bottom, top, and center of doors and windows. The sale is beyond anything ever offered to an agent. From $10 to $25 per day can be made. Send for agent's circular. The first who apply secure a bargain. 19 8 J. B. BRADSTREET & CO., Boston, Mass.

ADAMS & ESALE'S PATENT GRAIN MOISTENER will moisten and toughen the bran of hard or frozen wheat, softening the berry, and improving the quality of the flour, and facilitating the process of bolting. A great saving in the work of preparing flour for the market. For territorial and manufacturing rights address ADAMS & ESALE, 19 2* Postoffice drawer, E. Avon, Fulton county, Ill.

"HOW TO DO IT."—Economy; or, A Short Cut to Good Reading.—All the best Magazines and Newspapers at Club rates! Putnams, Harpers Atlantic, Galaxy, $4 each, and the PHRENOLOGICAL JOURNAL, $3. Sent a year for $6. With Living Age, only $9; with Weekly Times, Tribune, Liberal Christian, Methodist, or Artisan, only $4 50. Or Phrenological, with N. Y. Observer, or Protestant Churchman, $6. Or Phren. Jour. with Hours at Home, Christian Intelligencer, Examiner and Chronicle, Home Journal, $5. Or Phren. J. with Independent, $4 50; with Christian Advocate or Scientific American, $5; Or the Phrenological alone, devoted to Physiognomy, Physiology, Ethnology, with Portraits and Biographies of most noted persons in the world, $3. Address S. R. WELLS, 389 Broadway, N. Y. 20 3

WATCHES.—$500.

I WILL CHEERFULLY GIVE THE above amount to any one who can surpass my imitation of Gold Watches. Description of metal and goods sent free on demand. Prices from $16 to $22. They are sent, C.O.D., with charges. Address JULES D. BUGUENIN VUILLEMIN, No. 44 Nassau st., New York. Call and examine for yourselves. 18 eow

MODELS, PATTERNS, EXPERIMENTAL, and other Machinery. Models for the Patent Office, built to order by HOLSKE MACHINE CO., Nos 528, 530, and 532 Water street, near Jefferson. Refer to SCIENTIFIC AMERICAN office. 14 tf

Sault's Patent
FRICTIONLESS Locomotive Valves, easily applied; requires no changes. 12 13*tf M. & T. SAULT COMPANY, New Haven, Conn

RICHARDSON, MERIAM & CO., Manufacturers of the latest improved Patent Daniels' and Woodworth Planing Machines, Matching, Sash and Molding, Tenoning, Mortising, Boring, Shaping, Vertical and Circular Re-sawing Machines, Saw Mills, Saw Arbors, Scroll Saws, Railway, Cut-off, and Rip Saw Machines, Spoke and Wood Turning Lathes, and various other kinds of Wood-working machinery. Catalogues and price lists sent on application. Manufactory, Worcester, Mass. Warehouse, 107 Liberty st., New York. 19 tf

AZURENE
CONCENTRATED INDIGO
For the Laundry.—Free from Oxalic Acid.—See Chemist's Certificate.
A Patent Pocket Pincushon or Emery Bag
IN EACH TWENTY CENT BOX.
For Sale by all respectable Grocers and Druggists.
14 13*

STEAM HAMMERS, TURN-TABLES, and Foundery Cranes. Address 14 tf GREENLEAF & CO., Indianapolis, Ind.

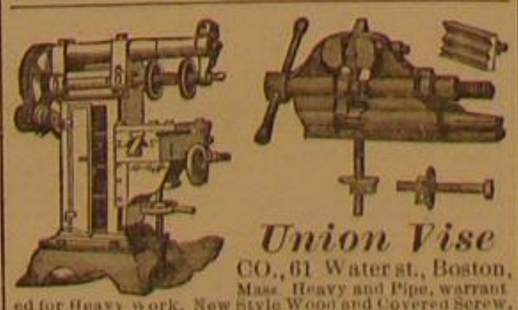
FOR LIGHT GRAY IRON CASTINGS, either Plain or Fancy. Finishing and Japanning of same. Also, Patterns of Wood or Metal. Address 18 4 BRISTOL FOUNDERY CO., Bristol, Conn.

Getty's Pat. Pipe Cutter
THIS Cutter works easy, rolls down the burr edge, and is confidently recommended to Gas and Steam Fitters as the best in the market.
No 1 cuts from 1-in. to ¼-in. Price.....$ 8.
No. 2 " 2-in. to ½ in. Price.....$10.
GETTY'S PATENT PROVING PUMP & GAGE. This new Pump and Gage has been thoroughly tested, and gives general satisfaction. There is no glass or mercury used, and the Gage is so compact it can be carried in the Pocket.
Pump and Gage.....$25. Gage alone.....$13.
Address McNAB & HARLIN, Manufacturers of Brass Goods and Iron Fittings, 86 John st., New York. 18 12

SHINGLE & HEADING MACHINE,—Law's Patent. The simplest and best in use. Shingle Heading, and Stave Jointers, Stave Cutters, Equalizers, Heading Turners, Planers, etc. Address 17 tf TREVOR & CO. Lockport, N. Y.

Organ Blowing
BY WATER POWER. For Engraving and Description of Apparatus invented M. Stannard, for the above use, address PRATT, WHITNEY & CO., Hartford, Conn., Manufacturers of First-class Machinists' Tools, Gun Machinery, Hydraulic Engines, and Special Machinery. 18 3

You Want Martha!
THE Most Valuable, Hardy White Grape yet known. A seedling from the Concord, and as perfectly hardy, healthy and vigorous as that variety, and ripens 10 days earlier. Quality best, both for table and wine. A splendid Grape in all respects. Send stamps for Illustrated Catalogues of over 50 varieties Grapes and small fruits, to GEO. W. CAMPBELL, Delaware, Ohio.



Union Vise
CO., 61 Water st., Boston, Mass. Heavy and Pipe, warranted for Heavy work. New Style Wood and Covered Screw, Stilling Machines, simple, great capacity, two sizes. 2,300 and 950 lbs. G. H. NOTT, President. A. H. BRAINARD, Superintendent. 10 13* tf

POWER LOOMS. Improved Drop Box, Spooling, Winding, Beaming, Dyeing and Sizing Machines, Self-Acting Wool Scouring Machines, Hydra Extractors. Also, Shafting, Pulleys, and Self Oiling Adjustable Hangers, manuf'd by THOS. WOOD, 2106 Wood st., Phil'a, Pa. 9 13

PORTABLE STEAM ENGINES, COMbining the maximum of efficiency, durability, and economy with the minimum of weight and price. They are widely and favorably known, more than 600 being in use. All warranted satisfactory or no sale. Descriptive circulars sent on application. Address J. C. HOADLEY & CO. Lawrence, Mass. 1 tf

WINCHESTER
Repeating Rifles,
FIRING TWO SHOTS A SECOND,
AS A REPEATER, AND
TWENTY SHOTS A MINUTE
AS A SINGLE BREECH-LOADER.

These powerful, accurate, and wonderfully effective weapons, carrying eighteen charges, which can be fired in nine seconds, are now ready for the market, and are for sale by all responsible Gun Dealers throughout the country. For full information send for circular and pamphlets to the WINCHESTER REPEATING ARMS CO., 13 13 New Haven, Conn.

TUBE WELLS.—The Champion Well of The World.—Horner's Patent. Orders received from England and South America. State, County, and Township Rights sold. Warranted to operate where others fail. Address, 13 13* W. T. HORNER, Buffalo, N. Y.

HUTCHINSON & LAURENCE, 8 Dey st., Dealers in every description of Iron and Woodworking Machinery. 18 4

PAGE'S GREAT WATER FLAME Coal, Patented Lime Kiln will burn No. 1 finishing lime with any coal or wood, mixed or separate, in same kiln. Rights for sale by C. D. PAGE, Rochester, N. Y. 24 26*

"BENEDICT'S TIME," for this Month. Timetables of all Railroad and Steamboat lines from New York, with City Map, 25c., sent by mail.
BENEDICT BROS., Jewelers, 171 Broadway.
BENEDICT BROS., up town, 691 Broadway.
BENEDICT BROS., Brooklyn, 234 Fulton st 1 tf

IMPORTANT.—MOST VALUABLE Machine for planing, irregular and straight work, in wood, is the Variety Molding and Planing Machine, for all branches of wood working. Our improved guards make it safe to operate. Combination collars for cutters save one hundred per cent. For planing, molding, and cutting irregular forms, the machine is unsurpassed.
We hear there are manufacturers infringing on our eight patents on this machine. We caution the public against purchasing such.
All communications must be addressed to COMBINATION MOLDING AND PLANING MACHINE CO., P. O. Box 3,220, New York city.
Our machines we warrant. Send for descriptive pamphlet. Agents solicited. 2 tf eow

VERY IMPORTANT.
THE WHOLE FOUNDATION OF THE OLD VARIETY MOLDING MACHINE, built at New York, is the GEAR PATENT, extended Sept. 30, 1867. The C. M. and P. Machine Company own ONLY A VERY LITTLE OF THE PATENT, outside of the State of New York. The owners, and Attorneys for owners, of the GEAR PATENT, and *sole* manufacturers of the best improved machines made for planing and molding straight and irregular forms in wood, perfectly safe to operate, with improved Feed Table, and improved adjustable collars for combination cutters, saveing 100 per cent for all the rest of the United States are
A. S. GEAR, JOHN GEAR & CO.,
New Haven, Conn., and Concord, N. H
☞ *We Warrant our Machines and Caution the Public to Buy Machines of Lawful Owners* ONLY.
☞ We are Sole Manufacturers of the only **practicable** Guards invented. They can be attached to any Machine.
☞ Send for a Descriptive Pamphlet. 18 e w tf

MANUFACTURERS—And others using Steam Engines can, by applying the IND CATOR, ascertain the condition of their Engines; the power required to do their work, or any portion thereof; the economy of fuel expended, when compared with power developed. The undersigned makes a specialty of this branch of engineering, and will wait on any party who desires his services. Instruments furnished and instruction given. F. W. BACON, 18 tfeow Consulting Engineer, 84 John st., N. Y.

Machine-made Watches
By the
TREMONT WATCH COMPANY,
BOSTON, MASS.
The Cheapest Reliable Watch. Their Watches are dust proof, and all have their best Chronometer Balance. For sale by all respectable dealers. 10 13eow*

Holiday Journal, New
No.—Free.—For the Holidays of 1868-9, containing a Christmas Story, Parlor Plays, Magic Sports, Odd Tricks, Quaker Experiments, Problems, Puzzles, etc. 16 large pages, illustrated. Sent Free. Address ADAMS & CO., 18 2eow Publishers, 25 Bromfield st., Boston, Mass.

MERRICK & SONS,
Southwark Foundery,
No. 430 Washington Avenue, Philadelphia.
William Wright's Patent
VARIABLE CUT-OFF STEAM ENGINE,
Regulated by the Governor.
Merrick's SAFETY HOISTING MACHINE,
Patented June, 1868. DAVID JOY'S PATENT
VALVELESS STEAM HAMMER.
D. M. Weston's Patent
Self-Centering, Self-Balancing Centrifugal Sugar-Draining Machine.
AND
HYDRO EXTRACTOR
For Cotton and Woolen Manufacturers.
10 eow tf New York Office, 62 Broadway.

GET THE BEST.—The Novelty Job Printing Press, for Amateurs, Druggists, Merchants, Descriptive circulars, & specimens of work mailed free. C. C. Thurston & Co., Brooklyn, N. Y. 18 2eow

MACHINERY.—S. C. HILLS, No. 12 Platt street, New York, dealer in all kinds of Machinery and Machinists' supplies. 1 tf 6

Bridesburg Manf'g Co.,
Office No. 65 North Front Street,
PHILADELPHIA, Pa.,
Manufacture all kinds of Cotton and Woolen Machinery including their new
Self-Acting Mules and Looms.
Of the most approved style. Plans drawn and estimates furnished for factories of any size. Shafting and mill gearing made to order. 9 tf13*

OIL! OIL!! OIL!!!
FIRST PREMIUM.....PARIS, 1867
Grand Silver Medal and Diploma!
WORLD'S FAIR—London, 1862.
TWO PRIZE MEDALS AWARDED
PEASE'S IMPROVED OILS!
Engine, Signal, Lard, and Premium Petroleum Is the Best Made for
Railroads, Steamers, and for Machinery and Burning.
F. S. PEASE, Oil Manufacturer,
Nos. 61 and 63 Main street, Buffalo, N. Y.
N. B.—Reliable orders filled for any part of the world. 21 tf

STEAM AND WATER GAGES, STEAM Whistles, Gage Cocks, and Engineer's Supplies. 16 13 JOHN ASHCROFT, 50 John st., New York.

U. S. PATENT OFFICE, WASHINGTON, D. C., Sept. 12, 1868.
Martin P. M. Cassity, of Granada, Kansas, administrator of the estate of Isaac H. Steer, deceased, having petitioned for an extension of the patent granted to Henry Carter, assignee of said Steer, the 19th day of June, 1855, and antedated the 19th day of December, 1854, for an improvement in "Making Nuts," it is ordered that said petition be heard at this office on the 12th day of December next.
Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.
17 3 S. H. HODGES, Acting Commissioner of Patents.

U. S. PATENT OFFICE, WASHINGTON, D. C., Oct. 24, 1868.
Aaron Palmer, of Brockport, N. Y., having petitioned for an extension of the patent granted him on the 30th day of January, 1855, for an improvement in "The Construction of the Frame of Grass Harvesters," it is ordered that said petition be heard at this office on the 11th day of January next.
Any person may oppose this extension. Objections, depositions, and other papers should be filed in this office twenty days before the day of hearing.
ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE, WASHINGTON, D. C., Oct. 24, 1868.
William F. Shaw, of Boston, Mass., having petitioned for an extension of the patent granted to him on the 23d day of January, 1855, for an improvement in "Gas Heaters;" it is ordered that said petition be heard at this office on the 11th day of January next.
Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.
ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE, WASHINGTON, D. C., Oct. 24th, 1868.
James Easterly, of Albany, N. Y., having petitioned for the extension of a patent granted to him on the 13th day of February, 1855; reissued in two divisions, numbered respectively 3,009 and 3,010, on the 30th day of June, 1868, for an improvement in "Base-burning Stoves," it is ordered that said petition be heard at this office on the 25th day of January next.
Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.
ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE, WASHINGTON, D. C., Oct. 16, 1868.
Jotham S. Conant, Hackensack, N. J., having petitioned for an extension of the patent granted him on the 16th day of January, 1855, for an improvement in "Sewing Machines" it is ordered that the said petition be heard at this office on the 28th day of December next.
Any person may oppose this extension. Objections, depositions, and other papers should be filed in this office twenty days before the day of hearing.
19 3 ELISHA FOOTE, Commissioner of Patents.

U. S. PATENT OFFICE, Washington, D. C., Oct. 7, 1868.
Fanny Holmes, of Whitehall, N. Y., executrix of the estate of John E. Newcomb, deceased, having petitioned for the extension of a patent granted the said John E. Newcomb on the 9th day of January, 1855, for an improvement in "Grain Harvesters," it is ordered that said petition be heard at this office on the 14th day of December next.
Any person may oppose this extension. Objections, depositions, and other papers, should be filed in this office twenty days before the day of hearing.
18 3 S. H. HODGES, Acting Commissioner of Patents.

THE American Bed Maker—Sells Rapidly. Agents Wanted. Illustrated circulars free. 19 2 J. H. MARTIN, Hartford, New York.

ENGINE LATHES—The Thomas Patent, for sale at reduced prices. JAMES JENKS, Detroit, Mich., Greenlee Bros. & Co., Chicago, Ill., Chas. H. Smith, Philadelphia, Thomas Iron Works, Worcester, Mass. 19 3*

R. A. BELDEN & CO., Manufacturers of Machinists' Tools, Iron Planers of improved patterns and designs, Crank Planers and Shaping Machines, Engine Lathes, Screw Machines, Milling Machines, and Gun Machinery. Also, Special Machinery, improved Nut and Bolt Machinery, Trip Hammers Models, Dies, etc., etc 18 3 1os 21s 208 Orange st., New Haven, Conn.

WOODWORTH PLANERS A SPECIALTY—From new patterns of the most approved style and workmanship Wood-working Machinery generally. Nos. 24 and 26 Central, corner Union street, Worcester, Mass. 16 tf WITHERBY RUGG & RICHARDSON.

SEND FOR BAIRD'S CATALOGUE OF Practical & Scientific Books POSTAGE FREE. H. C. BAIRD 406 INDUSTRIAL PUBLISHER WALNUT ST. PHILADELPHIA, PA. 18 4

THE NATIONAL CORN HUSKER having been thoroughly tested on the farm, is now offered to the public. It picks the ears from the stalks, and husks them perfectly without injury. By the hand machine 300 bushels per day can be easily husked; with one-horse power, 600. Rights for sale. Machines will be furnished to purchasers of territory at cost. Office of the NATIONAL CORN HUSKER CO., No. 164 Duane st., New York. 19 2

$20 A DAY to MALE and FEMALE AGENTS—To introduce the BUCKEYE $20 SHUTTLE SEWING MACHINES. Stitch alike on both sides, and is the only Licensed Shuttle Machine in the market, sold for less than $40. All others are infringements, and the seller and user are liable to prosecution and imprisonment. Full particulars free. Address W. A. HENDERSON & CO., 19 4 Cleveland, Ohio.

A GOOD NUMBER!—The Best yet issued!—See Portraits and Biographies of Isabella, the late Queen of Spain, Max Muller, Isaac Taylor, Schiller, Chamisso, Gellert, Uhland, Heine, German Lyric Poets; Mrs. T. McGath, 107 years old; Gounod, the author of "Faust;" The Antiquity of Man; Shakespeare's play of Macbeth; Is Man Immortal? Getting Rich; Count Chorinski & the German Murderess, Baroness Ebergenyi, with suggestions on Culture and Crime; The Crisis in Life; Emerson on the Eye; Recreation vs. Stimulation; Tobacco and Baldheads; A good judge of Character; The New England Fisheries; May Twins Marry? etc. Only 30 cents, or $3 a year. Newsmen have it. Address S. R. WELLS, Publisher, 389 Broadway, New York. 19 2

LATHE CHUCKS—HORTON'S PATENT—from 4 to 36 inches. Also for car wheels Address, E. HORTON & SON, Windsor Locks, Conn. 19 tf

Zur Beachtung für deutsche Erfinder!

Nach dem neuen Patentgesetze können Deutsche unter denselben Bedingungen wie Bürger der Vereinigten Staaten, ihre Erfindungen sich durch Patente sichern.

Die Patentgesetze nebst den Regeln und Instruktionen der Patentämter und anderer nützlichen Informationen werden portofrei an Alle gegen Einsendung von $5 Gold versandt. Patente für neue Erfindungen werden von uns in den Ver. Staaten sowie in Europa prompt besorgt.

Man adressire

Munn & Co.,
37 Park Row, N. Y.

PATENT CLAIMS.—Persons desiring the claim of any invention, patented within thirty years, can obtain a copy by addressing a note to this office, giving name of patentee and date of patent, when known, and inclosing $1 as a fee for copying. We can also furnish a sketch of any patented machine to accompany the claim, at a reasonable additional cost. Address MUNN & CO. Patent Solicitors, No. 37 Park Row New York.

PATENTS

The First Inquiry that presents itself to one who has made any improvement or discovery is: "Can I obtain a Patent?" A *positive* answer can only be had by presenting a complete application for a Patent to the Commissioner of Patents. An application consists of a Model, Drawings, Petition, Oath, and full Specification. Various official rules and formalities must also be observed. The efforts of the inventor to do all this business himself are generally without success. After a season of great perplexity and delay, he is usually glad to seek the aid of persons experienced in patent business, and have all the work done over again. The best plan is to solicit proper advice at the beginning.

If the parties consulted are honorable men, the inventor may safely confide his ideas to them: they will advise whether the improvement is probably patentable, and will give him all the directions needful to protect his rights.

Messrs. MUNN & CO., in connection with the publication of the SCIENTIFIC AMERICAN, have been actively engaged in the business of obtaining patents for over twenty years—*nearly a quarter of a century*. Over Fifty thousands inventors have had benefit from our counsels. More than one third of all patents granted are obtained by this firm.

Those who have made inventions and desire to consult with us, are cordially invited to do so. We shall be happy to see them in person, at our office, or to advise them by letter. In all cases they may expect from us an *honest opinion*. For such consultations, opinion, and advice, *we make no charge*. A pen-and-ink sketch, and a description of the invention should be sent, together with stamps for return postage. Write plainly, do not use pencil nor pale ink, nor be brief.

All business committed to our care, and all consultations, are kept by us *secret and strictly confidential*. Address MUNN & CO., 37 Park Row, New York.

Preliminary Examination.—In order to obtain a Preliminary Examination, make out a written description of the invention in your own words, and a rough pencil or pen-and-ink sketch. Send these with the fee of $5 by mail, addressed to MUNN & CO., 37 Park Row, and in due time you will receive an acknowledgment thereof, followed by a written report in regard to the patentability of your improvement. The Preliminary Examination consists of a special search, which we make with great care, among the models and patents at Washington to ascertain whether the improvement presented is patentable.

In Order to Apply for a Patent, the law requires that a model shall be furnished, not over a foot in any dimensions,—smaller, if possible. Send the model by express, pre-paid, addressed to Munn & Co., 37 Park Row, N. Y., together with a description of its operation and merits. On receipt thereof we will examine the invention carefully and advise the party as to its patentability, free of charge.

The model should be neatly made of any suitable materials, strongly fastened, without glue, and neatly painted. The name of the inventor should be engraved or painted upon it. When the invention consists of an improvement upon some other machine, a full working model of the whole machine will not be necessary. But the model must be sufficiently perfect to show, with clearness, the nature and operation of the improvement.

New medicines or medical compounds, and useful mixtures of all kinds, are patentable.

When the invention consists of a medicine or compound, or a new article of manufacture, or a new composition, samples of the article must be furnished, neatly put up. Also, send us a full statement of the ingredients, proportions mode of preparation, uses, and merits.

Reissues.—A reissue is granted to the original patentee, his heirs, or the assignees of the entire interest, when by reason of an insufficient or defective specification the original patent is invalid, provided the error has arisen from inadvertence, accident, or mistake without any fraudulent or deceptive intention.

A patentee may, at his option, have in his reissue a separate patent for each distinct part of the invention comprehended in his original application, by paying the required fee in each case, and complying with the other requirements of the law, as in original applications.

Each division of a reissue constitutes the subject of a separate specification descriptive of the part or parts of the invention claimed in such division; and the drawing may represent only such part or parts. Address MUNN & CO., 37 Park Row, for full particulars.

Interferences.—When each of two or more persons claims to be the first inventor of the same thing, an "Interference" is declared between them, and a trial is had before the Commissioner. Nor does the fact that one of the parties has already obtained a patent prevent such an interference; for, although the Commissioner has no power to cancel a patent already issued, he may, if he finds that another person was the prior inventor, give him also a patent, and thus place them on an equal footing before the courts and the public.

Caveats.—A Caveat gives a limited but immediate protection, and is particularly useful where the invention is not fully completed, or the model is not ready, or further time is wanted for experiment or study. After a Caveat has been filed, the Patent Office will not issue a patent for the same invention to any other person, without giving notice to the Caveator, who is then allowed three months time to file in an application for a patent. A Caveat, to be of any value, should contain a clear and concise description of the invention, so far as it has been completed, illustrated by drawings when the object admits. In order to file a Caveat the inventor needs only to send us a letter containing a sketch of the invention, with a description in his own words. Address MUNN & CO., 37 Park Row, N. Y.

Additions can be made to Caveats at any time. A Caveat runs one year, and can be renewed on payment of $10 a year for as long a period as desired.

Quick Applications.—When, from any reason, parties are desirous of applying for Patents or Caveats, in GREAT HASTE, without a moment's loss of time, they have only to write or telegraph us specially to that effect, and we will make special exertions for them. We can prepare and mail the necessary papers at less than an hour's notice, if required.

Foreign Patents.—American Inventors should bear in mind that, as a general rule, any invention that is valuable to the patentee in this country is worth equally as much in England and some other foreign countries. Five Patents—American, English, French, Belgian, and Prussian—will secure an inventor exclusive monopoly to his discovery among ONE HUNDRED AND THIRTY MILLIONS of the most intelligent people in the world. The facilities of business and steam communication are such that patents can be obtained abroad by our citizens almost as easily as at home. The majority of all patents taken out by Americans in foreign countries are obtained through the SCIENTIFIC AMERICAN PATENT AGENCY. A Circular containing further information and a Synopsis of the Patent Laws of various countries will be furnished on application to Messrs. MUNN & CO.

For Instructions concerning Foreign Patents, Reissues, Interferences, Hints on Selling Patents, Rules and Proceedings at the Patent Office, the Patent Laws, etc., see our Instruction Book. Sent free by mail on application. Those who receive more than one copy thereof will oblige by presenting them to their friends.

Address all communications to

MUNN & CO.,
No. 37 Park Row, New York City.
Office in Washington, Cor. F and 7th streets.

Patents are Granted for Seventeen Years, the following being a schedule of fees:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Reissue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay $500 on application

---

To Shipbuilders.

KNOWLTON'S IMPROVED BEVEL SAW. Patented April 7th, 1868. Acknowledged by Builders to be the Best in the World. Needed by every Enterprising Shipbuilder. Does its work quickly and perfectly; will save 500 per cent in labor, and effects a very great saving of material. Can be seen in operation at Neafie & Levy's Yard, Philadelphia. Built at John L. Knowlton's Works, 130 Reed st., Philadelphia. Send for Descriptive Pamphlet. Address TAYLOR & LEE, Sole Agents, 1701 North st., below Coates, Philadelphia, Pa.

PATTERN LETTERS to put on Patterns for Castings, etc. KNIGHT BROS., Seneca Falls, N.Y. 1 50*

$12.50 Per Day. Expenses paid. Business new. J. S. Hayes, Great Falls, N.H. 20 4os

---

SUPERIOR RASP—For clover Mills—at less than manufacturers' cost. 10 3os J. BURNS, West Geneseo, N. Y.

WANTED.—Parties having second-hand Steam Engines or Boilers, and wishing to dispose of them, can find a purchaser, if the price is right, by addressing (stating particulars), HAWKINS & JAMES, 193 South Water st., Chicago, Ill. 20 3os

---

J. T. PHILLIPS, Millwright and Mechanical Engineer, No. 13 Adams st., Brooklyn, N. Y.—Drawings, Specifications, and Estimates made for, and personal attention given to, the building of Flour Mills, Grain elevators, and general Millwright Work in any part of the country. 10 2

Factory, Trenton, N. J.....Office, No. 2, Jacob st., N. Y.
☞ Branch Office for Pacific Coast, No. 606 Front st., San Francisco, Cal. 20 tf

---

London.....48 Cannon street.
H. KOHNSTAMM,
Manufacturer of
ULTRAMARINE,
And Importer of English, French, and German Colors, Paints, and Artists' Materials, Bronzes and Metals, No. 3 Tryon Row, New York, opposite City Hall. 19 13os

---

AMES IRON WORKS, Oswego, N. Y., For Sale or to Rent. The long-continued ill health of the proprietor makes mental relaxation necessary.

These works employ about One Hundred men, are eligibly situated, and have a good business established, and to a man of some means and good ability this is a rare chance. Terms easy. H. M. AMES.
17 4os*

THE MAGIC COMB

Will color the Hair or Beard a permanent Black or Brown It contains no poison. There is no slop or stain arising from its use. If you buy one you will forever discard all other hair dyes or preparations. One Comb will be forwarded to any person on receipt of $1 25. Price lists furnished to dealers only, on application. Address W. PATTON, Treasurer Magic Comb Co., 19 4os Springfield, Mass. For sale everywhere.

Reynolds'
TURBINE
WATER WHEELS
And all kinds of
MILL MACHINERY.
Send for New Illustrated Pamphlet for 1868.
GEORGE TALLCOT,
96 Liberty st., New York.
15 os 13*

EAGLE ANVILS, and PARALLEL CHAIN VISES.

Manufactured ONLY by
[15 26os*] FISHER & NORRIS, Trenton, N. J

WM. D. ANDREWS & BROTHER,
414 Water st., New York, Manufacture
Patent Smoke-burning & superheating Boilers that are safe. DRINAGE and WRECKING PUMPS, to pass large bodies of water, Sand, and Gravel. HOISTING MACHINES, Friction Grooved and Noiseless, or with Gearing. OSCILLATING ENGINES, from half to two hundred and fifty horse power. All of these Machines are Light, Compact, Durable, and Economical. 13 13os

---

UNIVERSAL MILLING MACHINE.

This machine has all the movements of a plain milling machine, and the following in addition:—the carriage moves and is fed automatically, not only at right angles to the spindle, but at any angle, and can be stopped at required point. On the carriage, centers are arranged in which rimers, drills, and mills can be cut, either straight or spiral. Spur and beveled gears can also be cut. The head which holds one center can be raised to any angle, and conical blanks placed on an arbor in it, cut straight or spiralling. Either right or left-hand spirals can be cut.

BROWN & SHARPE MF'G CO., Providence, R. I.
16 5os eow*

HICKS' Improved CUT-OFF ENGINE, AND Non-Explosive Circulating Boiler
Cannot be equaled for correctness of principle, economy in operation, perfection of workmanship, and cheapness of price. W. C. HICKS, 85 Liberty st., New York.
...eow

LE COUNT'S PATent Hollow Lathe Dogs and Clamps.—A set of 8 dogs from ¾ to 2-in., inclusive, $8. A set of 12 from ¾ to 4-in., $11 50. Five sizes Machinists' Clamps, from 2 to 6-in., inclusive, $11. Send for Circular.
C. W. LECOUNT.
South Norwalk, Conn.
18 tf eow

BEFORE BUYING WATER WHEELS, See, or send for description of Pressure Turbine, made by PEEKSKILL MAN'F'G CO., Peekskill, N. Y. 11 13os*

Ready Roofing

THE FIRST CUSTOMER IN EACH place can buy 1000 feet for $20, about half price. Samples and circulars sent by mail. Ready Roofing Co., 81 Maiden Lane, New York. 12 tf os

---

Pressure Blowers

OF ALL SIZES, for purposes where a blast is required. For particulars and circulars, address B. F. STURTEVANT, No. 72 Sudbury st., Boston, Mass. 16 tf os

---

THE INDICATOR APPLIED to Steam Engines. Instruments furnished and instruction given. F. W. BACON, 1 tf 84 John st., New York.

WOODWARD'S COUNTRY HOMES. 150 Designs, $1 50, postpaid, GEO. E. WOODWARD, Architect, 191 Broadway, N. Y. Send stamp for catalogue of all new books on Architecture.
9 ostf

DO YOU WANT GAS

WE can afford to pipe your house, or pay for your fixtures, or both and leave them as your property if we cannot put up a Machine that shall be perfectly satisfactory under any and every condition. Circulars and information. UNION GAS CO., 1 os tf 14 Dey st., New York.

TWIST DRILLS, FLUTED HAND REAMERS, exact to Whitworth's gage, and Beach's Patent Self Centering Chuck manufactured by Morse Twist Drill and Machine Co., New Bedford Mass. 9 ostf

---

$2000 A Year and Expenses to Agents to introduce the Wilson Sewing Machine. Stitch alike on both sides. Sample on 2 weeks trial. Extra inducements to experienced agents. For further particulars, address the Wilson Sewing Machine Co., Cleveland, Ohio; Boston, Mass.; or St. Louis, Mo. 16 8 os

---

ROOT'S WROUGHT IRON SECTIONAL
SAFETY BOILER
Has no large sheet-iron shell to explode; is tested to 300 lbs.; economical and durable. Also ROOT'S Trunk Engines. Vertical and Horizontal Engines, all descriptions. Steam Pumps, Machinery, etc. Send for pamphlets and price lists. Agents wanted. JOHN B. ROOT, 11 13os Nos. 95 and 97 Liberty st., near Broadway.

FREE. Our New Catalogue of Improved STENCIL DIES. More than $200 A MONTH is being made with them S. M. SPENCER & CO., Brattleboro, Vt. 1 tf

---

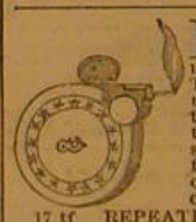
WIRE ROPE.
Manufactured by
JOHN A. ROEBLING
Trenton, N. J.
FOR Inclined Planes, Standing Ship Rigging, Bridges, Ferries, Stays or Guys on Derricks and Cranes, Tiller Ropes, Sash Cords of Copper and Iron, Lightning Conductors of Copper. Special attention given to hoisting rope of all kinds for Mines and Elevators. Apply for circular, giving price and other information.
14 os tf

KIDDER'S PASTILLES—A Sure Relief for Asthma. STOWELL & CO., Charlestown, Mass. 15 6os*

FOR FIRST-CLASS MACHINERY FOR the Manufacturing of Spokes, Hubs, etc., address the manufacturer, J. GLEASON, 1030 Germantown avenue, Philadelphia, Pa., U. S. A. 19 12os

---

WROUGHT-Iron Pipe for Steam, Gas and Water; Brass Globe Valves and Stop Cocks, Iron Fittings, etc. JOHN ASHCROFT, 50 John st., N. Y. 16 13



POCKET REPEATING LIGHT.—A neat little self-lighting pocket instrument, with Improved Tape Matches, giving instantly a clear beautiful flame by simply turning a thumb piece, and can be lighted fifty times in succession without filling. A sample instrument, filled with the inflammable tape, with circular and list of prices, sent by mail on receipt of 65 cents. Address
17 tf REPEATING LIGHT CO., Springfield, Mass.

SECOND-HAND
Machinery and Boilers
FOR SALE.

One	25-H. P. Corliss Engine.
Three	30-H. P., Slide Valve, do.
One	100-H. P., Howes & Phillips, do.
One	25-H. P. Locomotive Boiler.
Three	30 H. P. Tubular do.
Two	30-H. P. Flue do.
One	45-H. P. do. do.
One	60-H. P. Engine with Flue, Boilers, and Complete fixtures, at Milwaukee, Wisconsin.

All the above are in complete order, and will be sold very low for cash. Address WASHINGTON IRON WORKS, New Burgh, N. Y. New York city office 57 Liberty st. 17 4

BUERK'S WATCHMAN'S TIME DETECTOR.—Important for all large Corporations and Manufacturing concerns—capable of controlling with the utmost accuracy the motion of a watchman or patrolman, as the same reaches different stations of his beat. Send for a Circular. J. E. BUERK, P. O. Box 1,057, Boston, Mass.

N. B.—This detector is covered by two U. S. patents. Parties using or selling these instruments without authority from me will be dealt with according to law. 15 12*

NEW AND IMPROVED BOLT CUTTER—Schlenker's Patent.—The Best in use. Cutting Square, Coach Screw and V-Thread by once passing over the iron. Cutter Heads can be attached to other Machines, or the ordinary Lathe. Taps furnished to order. Circular price list, with references, mailed on application. 15 tf R. L. HOWARD, Buffalo, N. Y.

R. BALL & CO., Worcester, Mass., Manufacturers of the latest improved patent Daniels', Woodworth's, and Gray & Wood's Planers, Sash Molding, Tenoning, Power and Foot Mortising, Upright and Vertical Shaping and Boring Machines, Scroll saws, Double Saw Bench, Re-Sawing, and a variety of other machines for working wood. Also, the best Patent Hub and Rail-car Mortising Machines in the world. Send for our illustrated catalogue. 12 tf

---

SETS, VOLUMES AND NUMBERS. Entire sets, volumes and numbers of SCIENTIFIC AMERICAN (Old and New Series) can be supplied by addressing A. B. C., Box No. 773, care of MUNN & CO., New York.

The Harrison Boiler.

THIS IS THE ONLY REALLY SAFE BOILER in the market, and can now be furnished at a *GREATLY REDUCED COST*. Boilers of any size ready for delivery. For circulars, plans, etc., apply to
HARRISON BOILER WORKS,
Philadelphia, Pa.; J. B. Hyde, Agent, 119 Broadway New York; or, to John A. Coleman, Agent, 53 Kilby st., Boston, Mass. 6 tfos 13*

IRON PLANERS, ENGINE LATHES, Drills, and other Machinists' Tools, of Superior Quality, on hand and finishing. For Sale Low. For Description and Price, address NEW HAVEN MANUFACTURING CO., New Haven. 15 tf os

---

WOODBURY'S PATENT
Planing and Matching
and Molding Machines, Gray & Woods Planers, Self-oiling Saw Arbors, and other wood-working machinery.
Send for Circulars { 85 Liberty street, N. Y.;
S. A. WOODS, { 107 Sudbury street, Boston.
11 13*

ASHCROFT'S LOW WATER DETECTor will insure your Boiler against explosion. JOHN ASHCROFT, 50 John st., New York. 16 13

FOR STEAM ENGINES BOILERS, SAW Mills, Cotton Gins, address the ALBERTSON AND DOUGLASS MACHINE CO., New London, Conn. 1 tf

---

STOCKS, DIES, AND SCREW PLATES, Hortop's and other Chucks. JOHN ASHCROFT, 50 John st., New York. 16 13

EMPLOYMENT.—$15 to $30 a day guaranteed. Male or Female Agents wanted in every town—descriptive circulars free. Address
15 15* JAMES C. RAND & CO., Biddeford, Me.

ROBERT McCALVEY, Manufacturer of HOISTING MACHINES AND DUMB WAITERS. 15 13 602 Cherry st., Philadelphia, Pa.

B. E. LEHMAN, MANUFACTURER OF brass and iron body globe valves and cocks, gage cocks, oil cups, steam whistles. Special attention paid to heavy iron body valves for furnaces and rolling mills. Send for price list to B. E. LEHMAN,
12 9 Lehigh Valley Brass Works, Bethlehem, Pa.

Boiler for Sale.

ADINSMORE'S PATENT BOILER, of about 50-Horse Power, nearly New, and in perfect order, will be sold very low (if applied for at once), to give place to a larger one. Enquire of SEYMOUR, MORGAN & ALLEN, Brockport, N.Y., or WOODBURY, BOOTH & CO., Rochester, N. Y. 18 3

BOILER FELTING SAVES TWENTY-five per cent of Fuel. JOHN ASHCROFT
16 13 50 John st., New York.

Lucius W. Pond,

IRON and Wood-working Machinery, Machinists' Tools and supplies, Shafting, Mill Gearing, and Jobbing. Also, Sole Manufacturer of TAFT'S CELEBRATED PUNCHES & SHEARS, (Works at Worcester, Mass.) 98 Liberty st., New York. 14 tf

---

CAMDEN
Tool and Tube Works,
CAMDEN, N. J. Manufacturers of WROUGHT IRON Welded Tube for Steam, Gas, and Water, and all the most Improved Tools for Screwing, Cutting, and Fitting Tube by Hand or Steam Power. Sole Manufacturers of Peace's Patent Adjustable Pipe Tongs, Clean-cutting Pipe Cutter. Also, Gas-pipe Screwing Stocks, polished. No. 1 Stock Screws ¼, ⅜, ½, ¾ Tube, price complete, with dies, $10. No. 2, do., 1, 1¼, 1½, 2 do., do., $20. No. 3 do., both screws and cuts off, 2½, 3, 3½, 4, do., do., $65. 11 13*

TODD & RAFFERTY, Manufacturers and DEALERS IN MACHINERY. Works, Paterson, N. J.; Warerooms, 4 Dey st., N.Y., Boilers, Steam Pumps, Machinists' Tools. Also, Flax, Hemp, Rope & Oakum Machinery; Snow's & Judson's Governor's; Wright's Patent Variable Cut-off and other Engines. tf 1

Sheet and Roll Brass,
BRASS AND COPPER WIRE,
German Silver, etc.,
Manufactured by the
THOMAS MANUFACTURING CO.,
Thomaston, Conn.
☞ Special attention to particular sizes and widths for Type Founders, Machinists, etc. 23 26*

CHARLES A. SEELY, CONSULTING and Analytical Chemist, No. 26 Pine street, New York. Assays and Analyses of all kinds. Advice, Instruction. Reports etc., on the useful arts. 1t

---

1868.

SCIENTIFIC AMERICAN.

Established 1845.

The **SCIENTIFIC AMERICAN** is published every week, and is the largest and most widely circulated journal of its class now published in this country. Each number is illustrated with **Original Engravings**, representing New Inventions in Mechanics, Agriculture Chemistry, Manufactures, Steam and Mechanical Engineering, Photography, Science, and Art; also Tools and Household Utensils. TWO VOLUMES with COPIOUS INDEXES, are published each year, commencing January 1st, and July 1st. **Terms**:—One Year, **$3**; Half-Year, **$1 50**; Clubs of Ten Copies for One Year, **$25**; Specimen Copies sent gratis.

Address

MUNN & CO.,
37 Park Row, New York.

☞ The Publishers of the **Scientific American**, in connection with the publication of the paper, have acted as **Solicitors of Patents** for **twenty-two years. Thirty Thousand** Applications for Patents have been made through their Agency. More than **One Hundred Thousand Inventors** have sought the counsel of the Proprietors of the **SCIENTIFIC AMERICAN** concerning their inventions. Consultations and advice to inventors, by mail, free. Pamphlets concerning Patent Laws of all Countries, free.

☞ **A Handsome Bound Volume**, containing **150** Mechanical Engravings, and the United States Census by Counties, with Hints and Receipts for Mechanics, mailed on receipt of **25c.**