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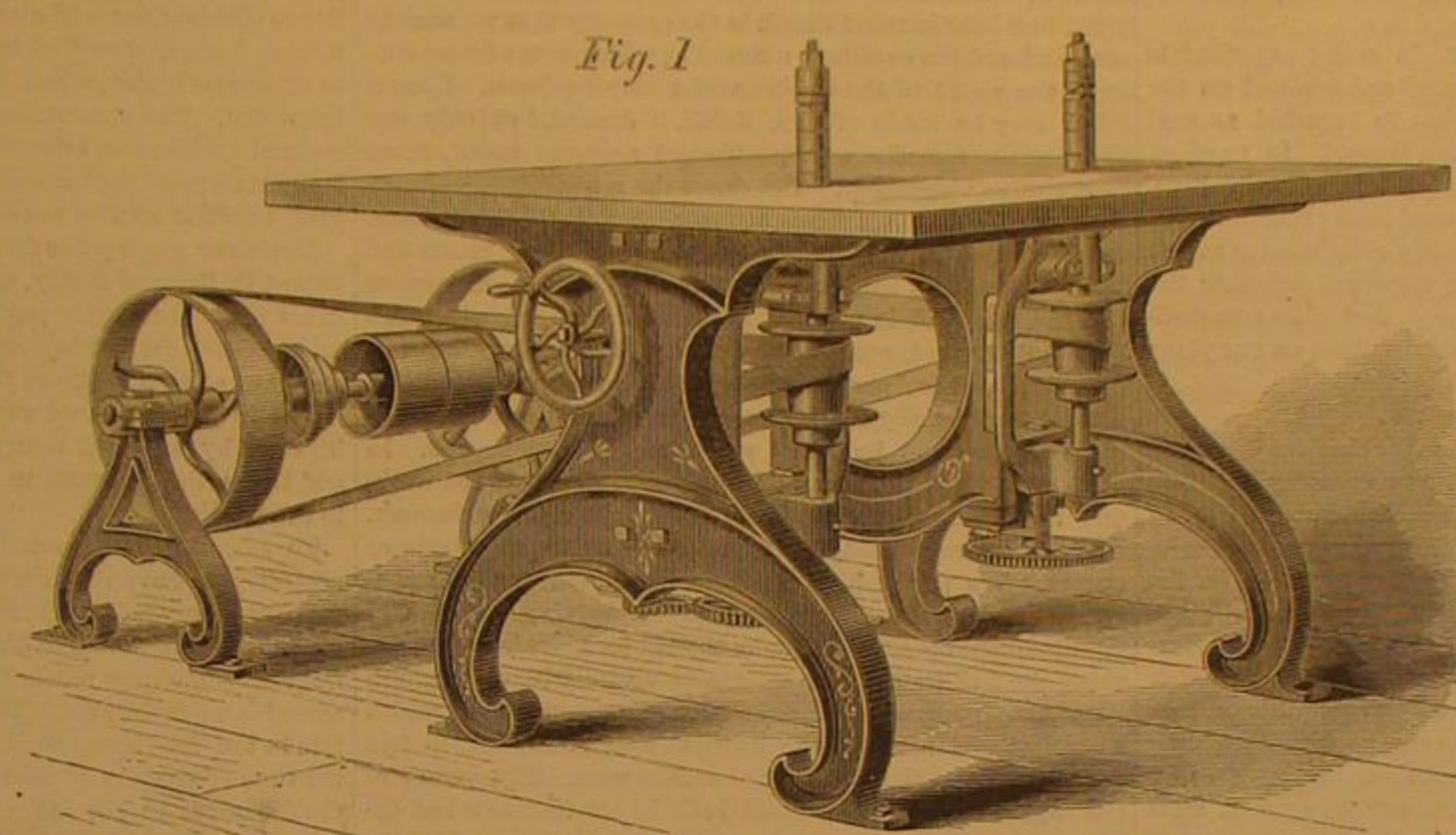
Improvement in Wood-working Machinery.

Before the invention of wood-molding machinery for curved work,—which dates back only about fifteen years—the labor of producing moldings on curves by hand was very great, so great that this style of ornamentation was rarely used. The Woodworth planing machine and the ordinary wood-turning lathe are undoubtedly the originals from which the simple planing and molding machines for sash and door makers proceeded, and these, combined with the lathe for turning irregular forms, contain the principles of the variety molding machine. Since the first inception of the machine, however, a number of important improvements have been made, being embraced in no less than nine patents.

Fig. 1 is a perspective view of the machine for cutting moldings of any desired pattern, on curves, regular or irregular, and of any radii required. There are two upright cutter heads projecting above the top or table of the machine, driven by belts on flanged pulleys or drums, from a counter shaft, provided, as usual, with fast and loose pulley. Instead of raising or lowering the table to adjust the work to the cutters, as is generally done, the cutter heads and their shafts, boxes, and pulleys, with a frame in which all are held, are raised and lowered by means of a screw, gear, and a pinion on an up-right shaft, to each cutter head, so that one works independently of the other. The upright shaft, carrying the pinion at its lower end—that gives motion to the gear and screw directly under the cutter-head frame—has a bevel gear on its upper end connecting with a similar gear on a horizontal shaft under the table, provided at its outer end with a hand wheel conveniently situated for the hand of the operator even when he is intently engaged in guiding the stuff to be cut.

Fig. 1

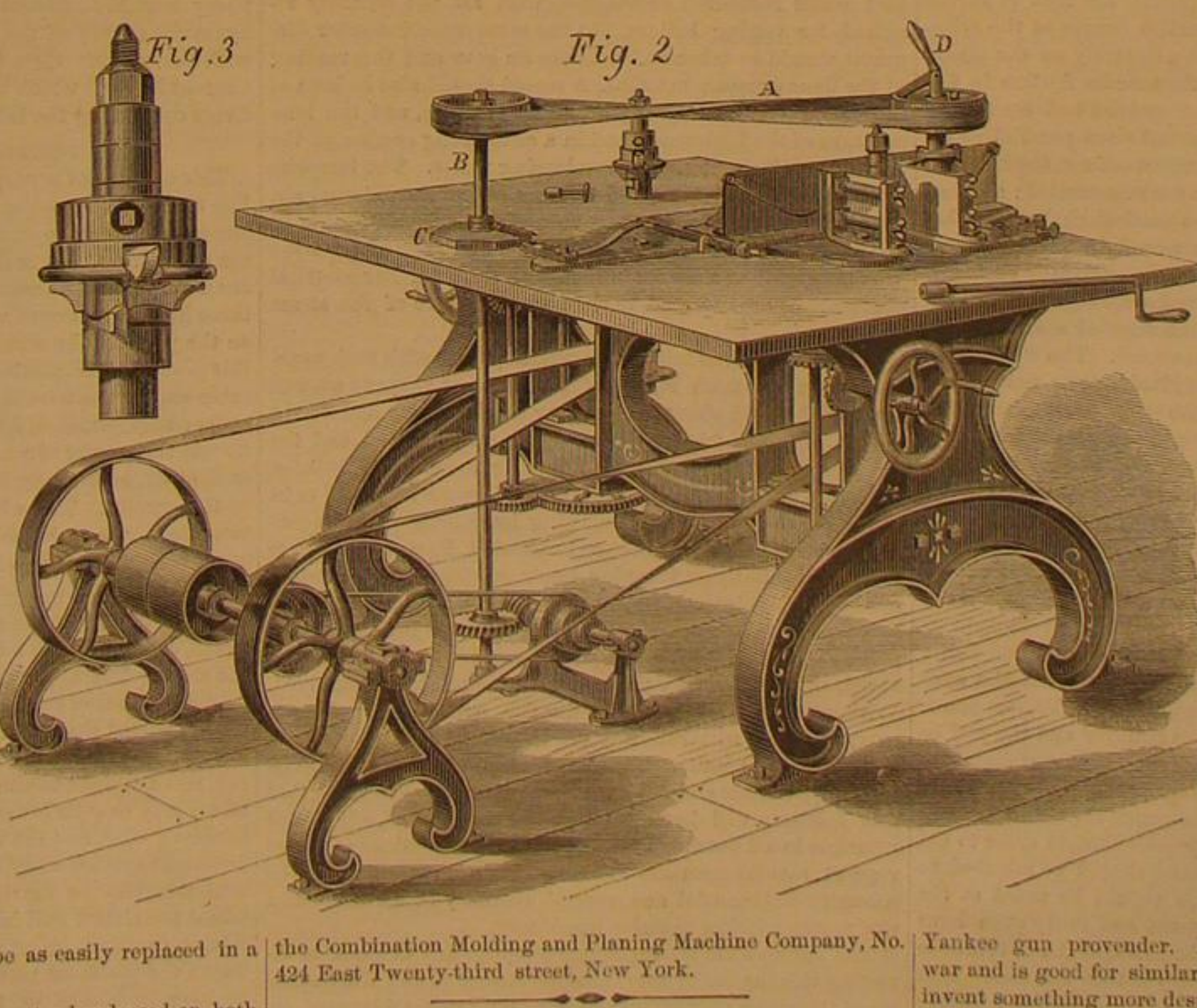


GROSVENOR'S IMPROVED VARIETY MOLDING MACHINE.

Fig. 2 is the same machine as Fig. 1 with the addition of a guide for cutting either straight or waved moldings. The guide is a plate which is held to the table top by two bolts for straight moldings. The guide is adjusted by means of horizontal screws at either end and held by set screws. The stock to be cut is fed between the guide and cutter-head by a roller on an upright shaft receiving motion by means of a belt, A, from a similar vertical shaft, B, that is driven by a belt from the counter shaft. This belt is taken from a cone on the counter to a similar cone to allow a change of feed. The shaft of the latter carries a worm that revolves the shaft, B, and consequently the feed roller. Buffers or spring guides, against which the stuff to be cut impinges in its passage, hold it well up to the vertical guide.

Fig. 3

Fig. 2



For waved molding the guide plate or platen on the table is pivoted at the forward end and held by a spiral or rubber spring, or by a weight at the other end to the ledge of a cam, C, on the shaft, B, which may be of any form desired to produce variations of the waved form. D is a shipper handle to stop or start the feed. This whole appurtenance is easily removed leaving the machine clear for irregular work as in Fig. 1, and may be as easily replaced in a mement.

Fig. 3 is an enlarged view of the cutter head used on both these machines. It is a combination of cutter head and rotary plane stock. Cylindrical flanges project downward from a disk or collar fitting the head stock and secured by set screws. These dished collars may be made of different sizes to suit the varying projections of the cutters from the head. In doing irregular work, where it is necessary to hold the stuff by hand to the cutter head, there has been danger of mutilating the hands by a sudden and undue action of the cutter upon the stuff in starting into the work. This has been a serious objection to other machines which this improved machine for irregular work has entirely obviated, it being impossible for an accident of this kind to occur. With this cutter head six or more cutters may be used at once to form a single molding; these may be transposed, producing over thirty different forms with the same cutters, at a great saving of time and labor. The cutters may be set at such an angle that they may cut against the grain without splitting the wood.

The machine is well adapted for moldings, brackets, lattice work, etc., for house finishing. It is especially adapted to the furniture and cabinet maker; carriage builders, agricultural implement makers, pattern makers, car builders, boat makers, and workers in many other mechanical branches will find it a great assistance in the different departments of their business.

All letters and orders for machines should be addressed to the Combination Molding and Planing Machine Company, No. 424 East Twenty-third street, New York.

Grape Shot.

"We have to record the demise of a distinguished and well-tried servant of the public, one of the very oldest members of the artillery service. Grape shot is no more. Who shall say when the career of this ancient projectile commenced? It was probably contemporary, or nearly so, with the introduction of artillery; for, without too nicely specifying particular patterns it may be said to have had its origin in the charges of old nails, coarse gravel, bits of iron, bolts, and the like, which, under the comprehensive term of "longridge," were used by artillerists as early as the fourteenth century. The little bags filled with stones of this epoch, and the canvas cartridges containing small iron balls, of a later time, furnish more exact prototypes of the modern form of grape, which consisted of an iron plate and spindle, piled round with iron balls enclosed in a canvas bag, the whole being "quilted" with a strong line and painted. The name "grape" was derived from the sort of rude resemblance which this projectile bore to a bunch of grapes. Outside the service, this is the form of grape best known; but, strictly speaking, it was superseded forty-six years ago by a description of grape known as "Caffin's pattern, after its inventor. The Caffin's grape, although approved in 1822, was not generally made until 1856, and it never quite shouldered the old-fashioned sort out of service, for to this day there exist at most stations stores of the latter, the greater part of these stores no doubt in an unserviceable condition. The Caffin's grape consisted of four tiers of circular iron plates, inclosing between them iron balls, and connected by an iron spindle which is passed through the centres of the plates. The old-fashioned grape never got over the shock inflicted by the introduction of this new pattern, and of late years its identity has become merged in great measure in case or "canister" shot, cylinders of tin or iron filled with balls. By increasing the size of these balls, and by improving the construction of cylinders themselves, a projectile, which was first known as "case-grape" was made to do duty at once for case and grape; and a recent order has removed the old grape shot from the list of British service stores. So distinguished a servant cannot, however, be allowed to take its departure, to mingle its ashes with those of the chain and bar shot of earlier ages, without a word, if not a tear, of regret. Its glory has been great in its day. Many and many a fine fellow has gone down before its fierce blows; many a breach has been swept by its whistling showers; the torn and shattered riggings of many a hostile ship have borne eloquent testimony to its destructive powers. But it is now among the things which have been improved off the face of the earth—off this English earth of ours at least. Among the changes and developments of modern artillery science it has found its rest. Grape shot, *pur et simple*, grape as the sailors of Nelson's day and the soldiers of Wellington knew it, is no more. A sort of hybrid projectile, a little more of case and less than grape, a projectile of superior destructive and more enduring powers, will henceforth take its place, and satisfy the requirements of a more critical age."—*London Pall Mall Gazette.*

The above may mislead inquirers. Whatever may be the orders of the British Admiralty or the ideas of the *Pall Mall Gazette*, it is certain that grape shot is not yet driven from our Yankee gun provender. It did efficient service in our late war and is good for similar service in future wars, unless we invent something more destructive for action at close quarters. We do not use "four tiers of iron circular plates, enclosing between them iron balls, and connected by an iron spindle which is passed through the centres of the plates." Our style of grape shot is simply two plates, suited to the bore of the gun, held apart by a coiled rod of iron wire, one-quarter of an inch in diameter, the coils being close enough to hold the balls—of one and a half inches diameter—the two heads of the cylinder guiding the charge into the gun, but by the force of the explosion flying apart and releasing the balls on the discharge of the gun. If our English cousins choose to dispense with the grape shot, we do not. It has served us too well to be rejected, until something better is contrived. Does the "case-grape" of the *Gazette* fulfill the conditions required?

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.

(*Concluded from page* 354.)

The next step is to find the quantity of water evaporated from a constant temperature, say 212°. From formula or tables find the total heat of the steam due to its mean total pressure; from this deduct the total heat which the water contained before entering the boiler. The result is the number of units of heat imparted to each pound of water. Divide this by the latent heat of steam at 212°, and multiply the quotient by the total number of pounds of water evaporated at the observed pressure. The result will be the total evaporation from our supposed temperature of 212°, and at atmospheric pressure, which divided by the total amount of coal burned, or, if desired, by the combustible, gives the the final result, in the usual comparative terms, viz., The Number of Pounds of Water Evaporated per Pound of Coal (or combustible). The coal may be corrected to a uniform rate of 10 per cent refuse, as has been before explained.

We have reason to suppose that, in many experiments abroad, the ashes were "weighed back" and credited on the coal account; in other words, that what is reported as coal was really only the combustible portion thereof. In purchasing coal we pay as much for the ashes as for the combustible, and ships must carry both, in a combined state; therefore, the report of every experiment should clearly state what is meant by the word coal, if that be the term employed, whether the weight of the coal, as actually purchased, that of its combustible, or a weight proportioned to the combustible, on our plans of correcting to a standard of 10 per cent refuse.

II. TESTING ENGINES.

We will examine, first, a simple mode which may be practically applied in every case, to test the economy of steam machinery, in the actual performance of its regular duty. In ordinary trials, where but little care and expense can be afforded, the engine and boiler must be tested as a whole, the comparison being made by "The Number of Pounds of Coal Consumed per Indicated Horse Power per Hour." The indicator is used to measure the power, because, as has been before explained, it is the simplest device we have for this purpose and most generally applicable. The results will be of little valve, however, except under the conditions hereinbefore expressed. We first desire to give, from our experience, some directions about the use of the indicator and the manner of attaching it to the engine. Since the invention of the "Richard's", or "Porter Indicator," the direct acting instrument known as the "McNaught Indicator" has fallen into disuse, except on engines working very slowly. We will make our remarks more especially applicable, then, to the first instrument, often called the "parallel-motion indicator." Before using the instrument, see that it is correctly made and in good order. To do this, examine the piston, see that it moves freely, without shake, through the entire length of the cylinder; see that the spring screws down squarely on the piston and does not tend to one side, and thus make friction in the guide of the piston rod; examine every joint and see that is free, without shake; see if the two links are parallel at all times and the radius arms at mid-position—if not, the arrangement is not a parallel motion and must be corrected; see that the arm carrying the levers has no vertical shake; see that the barrel runs true, and adjust a pencil in place to bear lightly upon it. The scale of the indicator should be tested by a mercury gage and the mark on the spring corrected accordingly. This is important, for the reputed scale is rarely correct and during repairs is often varied. The instrument should never be connected to the cylinder ports, nor in any position where a current passes the connecting pipe. The connections should be large, short, and direct. Be careful to give the barrel the correct reduced motion of the engine piston. Other details may be arranged as convenient. The instrument should be thoroughly heated before taking a diagram or marking the atmospheric line. The pencil should be made to bear as lightly as it will make a mark, and it should be allowed to run over the paper several times. Both ends of the cylinder should be indicated.

Before beginning an experiment, both engine and boiler should be in an average working condition. At the commencement, the fire should be clean and its thickness noted. The contents of the ash pit should be removed and the coal be weighed the same as in testing boilers. Indicator diagrams should be taken once an hour, or every half hour, or even less, if the load varies considerably. The pencil should be allowed to remain on each diagram a considerable time, in order to get a fair average. A register or counter should be attached to the engine, the indications of which should be noted at the beginning and end of the experiment and every even hour intervening. If a register cannot be obtained the revolutions should be counted and recorded every fifteen minutes. This should be continued not less than eight hours, and a longer time is preferable. At the end of the experiment the fire should be clean and of the same thickness as at the beginning, the same as in testing boilers. A log should be kept during the progress of the experiment, showing the time, pressure of steam, revolutions of engine, weight of coal and ashes, and other matters of interest. The calculations are simple and need not be detailed. We will here remark that the fault with most experiments is the short time for which they are tried To ascertain accurately the consumption of fuel in a given case requires, as has been said, at least eight hours continuous action, and the mean power cannot be obtained, in many instances, in much less time. A single diagram, taken occasionally, gives little idea of the actual power exerted, for, in every manufactory, the load is constantly changing. It is more than probable that the excellent results claimed in many cases are obtained by calculating the power from a diagram taken with the full load on, and the cost of the power from the average coal, or, worse yet, from the coal which is thrown in the furnace in any particular hour, without noticing whether the fire is heavier at the beginning of the hour than at the end. A manufacturer's coal bills always tell him what his steam power has cost for a given time, but his 100-horse power engine might have been exerting, on the average, only 50-horse power, so without actual and careful observation, no results can be obtained of any value to the engineering profession. The only true way is to make thorough trials and repeat them until the results practically coincide.

When the power of the engine is measured by a dynamometer, the same care should be taken to frequently record the revolutions of the engine and the indications of the instrument, so as to be able to calculate the true average power. Fuller reasons, for such precautions have already been given in the preceding discussion.

We are now prepared to select the methods and means necessary for a scientific trial of the economy of steam machinery, which shall be complete and above criticism. We must first bear in mind that it is the economy that we wish to test, and not the excellent manner in which some device controls the speed of the engine, under varying loads. Special trials may be made of each detail, if desired, but only one thing can be tested at a time. To get accurate result, great uniformity is necessary. The closer the resemblance between the records at different times, the more correct will be averages. It is essential, then, to carry a uniform pressure of steam and to have a uniform load and speed to the engine. In regular practice, the load is necessarily varied somewhat, which can only be provided against by frequent observations, but our remarks are more particularly applicable to an establishment fitted up especially to test steam machinery, and in other trials details must be varied according to circumstances. In such case the boiler should be of ample size to do the work, and the pressure should be regulated by a steam damper. The resistance should consist of wind or water wheels or pumps. We prefer high speed fans or blowers, as the resistance can then be easily regulated by varying the size of the discharge openings. Tanks should be provided for measuring the feed water of the boiler,and it would be well, though not strictly necessary, to have a surface condenser from which to collect and measure the distilled water, and thus, in two ways, ascertain the quantity of steam used. The power of the engine should be measured both by the indicator and dynamometer, and duplicate registers should be provided to count the revolutions. The better plan, in order to give the same area of indicator diagram, is to use, in each experiment, a cut-off fixed at any desired point, and not use the governor. In such case special means must be provided to keep up a uniform lubrication, which, with the uniform resistance proposed, will secure uniform speed.

When experimenting, the coal should be weighed and the feed water measured or weighed, with all the accuracy required for testing boilers. At the same time indicator diagrams should be taken at least once an hour and the reading of the dynamometer recorded. A record should also be kept of the time, revolutions of engine, steam pressure, and the temperature of the feed water, and in a condensing engine, of the hot well and circulating or condensing water. The temperatures of the engine and fire rooms, and of the external air, should also be noted, to show the effect on condensation in the pipes and passages. The direction and force of the wind are also useful, to show its influence on the fires. Barometrical observations are essential to show the true zero of the steam pressures.

Experiments conducted thus carefully, and with such apparatus, would furnish results of the greatest value to science. Each trial would show the economy of the boiler and of the engine, also the friction of the engine and its load, and the net power and its cost, besides affording much valuable information to aid in the explanation of the losses which now exist in the steam engine, and suggesting improvements in its construction. The United States Expansion Experiments were tried substantially on this plan, but were stopped when results of the greatest interest were being obtained. Could an establishment be now opened to manufacturers and inventors, how much capital, physical exertion, and mental anxiety could be saved, and how greatly the steam engine might be improved. Without such a place, however, much good can be done if every engineer will carefully use the means at his command and record the results. The awards at all our Fairs should be based upon trials and not upon mere opinion. We trust that this Institute will hereafter, as it has commenced, adopt this principle in all possible branches of their exhibitions; and we request that its members will assist us in promulgating the necessity of impartial and careful accuracy in all trials and statements relating to steam machinery.

The Yankees are an ingenious people. Let us assist in directing this ingenuity into scientific channels, and the character of the result may be judged from the present advanced position of our high pressure engines. By fully discussing the subject of economy and generally circulating complete records of competitive trials, an important branch of industry will be stimulated, all classes benefited, and American engineering become the standard throughout the civilized world.

A PRACTICAL acquaintance with the hand tool will save the machinist many hours of vexatious labor.

SCIENTIFIC OBSERVATIONS ON THE SUPPLY AND OUTFLOW OF THE NORTHWESTERN LAKES---THE METER AND METHOD OF USING IT---RESULTS OF THE OBSERVATIONS.

From the Detroit Post.

It is now about two years since the newspapers of the West began to discuss whether the great lakes are fed by subaqueous springs or have hidden outlets. The parties who favored the theory of subaqueous springs, asserted that more water flowed out the St. Lawrence than could be poured in by all of the sources of supply known to exist; while the upholders of the idea of hidden outlets contended that evaporation and the visible outflow could not account for all the water which the lakes received and distributed. Both sides found encouragement for their views, in the fact of the periodic rising and falling of the waters in the lakes; in that of the occasional sudden and rapid increase and decrease from the mean level of the waters; and in other phenomena which had been observed to exist. However, no one had given the matter a complete investigation, although it was one of some scientific as well as popular interest. General W. F. Raynolds, Superintendent of the Lake Survey, determined to give the subject such consideration as, in the West, could only be afforded by the engineers employed on that work, and accordingly, for the past two summers, observations have been made in the Ste. Marie's, St. Clair, Detroit, Niagara, and St Lawrence Rivers for the purpose of ascertaining the exact amount of outflow of the lakes. These observations will also and in fixing the general laws of flowing bodies, a subject in which the owner of every mill, or other machinery, which is driven by water-power, is directly interested. The observations already made, tend to unsettle some of the theories heretofore received. The apparatus used is so much more perfect and delicate than anything else of its kind that the results are of great value.

The river gaging has from the start, been intrusted to Assistant D. Farrand Henry, of this city, who has succeeded well in his task. During the summer just past, he had three parties, under Assistants Lewis Foote, A. R. Flint, and Mr. Wallace, stationed at Fort Niagara, Ogdensburgh, and St. Clair.

The implements used are peculiar to the work, and were invented by Assistant Henry. The result of his observations, and the method pursued in making them, will be interesting to the public.

To calculate the amount of outflow of any stream, it is necessary to have the area of the body of water, and its mean velocity, at any point. These two quantities multiplied together give the discharge. The first is easily obtained by making frequent soundings across the stream on a known line. The second is more difficult. The only practical methods heretofore in use, for the determination of the velocity are, first, by the time of passage of floats past a known line; second, by the difference in the hight in which water will stand in two tubes, one of which is bent toward the current at the bottom and the other is straight; and, third, by water-mills, as they are termed, which consist of float wheels exposed to the current, the number of revolutions being recorded by a system of decimal gears or telltale. Of these methods, the first is the only one which has been used in deep water.

During the first season Assistant Henry adopted the first method, using the double floats used by Generals A. A. Humphery and A. L. Abbott, of the Corps of Engineers, in their hydraulic survey of the Mississippi River. Being dissatisfied with the results then obtained, he devised a "Telegraphic Current Meter," which he has successfully used in the several rivers connecting the lakes during the past season.

DESCRIPTION OF THE METER.

This consists of a propeller or float wheel, which has on its hub an eccentric, and on the axle an ivory lever, which has one end kept on the excentric by a light spring, while into the other end a hole is drilled, meeting another hole, drilled at an angle with it, near the center of the bottom side. Into these holes a platinum wire is forced, so that the lever rests on the point of the wire coming out of the center hole. Under this point a small platinum plate is fastened to the axle. The other end of the wire is connected by a hinge joint to a long copper wire, which is fastened to the axle, but insulated from it. At the rear of the axle are two vanes, at right angles to each other, sufficiently large to keep the wheel in the thread of the current. The whole is suspended by a yoke which has two small eyes on its side.

THE METHOD OF USING.

The method of using the meter is as follows: A boat being anchored in the stream at the point where the current is to be tested, a weight with a copper wire attached is let down from the stern. The upper end of this wire is fastened to a spring pole, which takes up most of the motion of the boat. This wire is passed through the eyes on the side of the yoke in the meter, a measured cord is fastened to a swivel ring in the upper, and a weight to one in the lower end of the yoke. The meter may now be lowered to any depth, sliding down the anchored wire, and the upper end of this wire and of that are fastened together with the platinum point, being connected with a battery in the boat, then at every revolution of the wheel the circuit will be opened and closed by the eccentric, raising the ivory lever, and thus breaking the connection between the platinum point and plate. If now a Morse's paper register be placed in the circuit, at ever revolution of the wheel a dot will be made on the moving paper, and thus the number of revolutions in any given time can be ascertained. For some determinations the Morse register was used, but on account of the amount of paper required, and the labor of counting the dots, the "counter" was generally preferred. This consists of a sounder register, in front of which a frame is fastened, carrying two gear wheels of 100 teeth each, the rear wheel having on its axle a ten-leaved pinion, with which the forward one engaged. On an extension of the armature lever is an ordinary escapement reaching a little past the center of the rear wheel, and wide enough to allow it to move freely when the armature is at the middle of its movement. The pallets engage the teeth of the wheel in such a manner, that the wheel is drawn forward one tooth each time the armature is drawn down and released, and, therefore, at each revolution of the wheel. Thus the meter can be raised and lowered on the anchored wire, can be allowed to run for any length of time at one place, and the counter can be stopped or started at any moment by a simple switch.

RESULTS OF THE OBSERVATIONS.

The observations in the river were taken on a known line, 100 feet apart, and at each five feet of depth. One of the first things noticed, was the irregularity of the beat of the counter, showing that the current pulsated. This has since been found to be the case in canals, mill races, streams, wherever it has been possible to place the meter, and it seems to be a general law of water in motion. This instability of the current had been previously noticed by Mr. James B. Francis, civil engineer, of the Lowell Hydraulic Works, in the irregular motion of floats.

The pulsations are not regular, the common maximums being from one-half to one and a half minutes apart, with every five or ten minutes a greater increase or decrease. They are least in the maximum current, and increase toward the bottom and sides of the stream.

The observations give the number of revolutions of the meter, but not the actual velocity of the current. To obtain this the coefficient of each meter, or the number by which the revolutions must be multiplied to obtain the true velocity, must be found. This can be ascertained by letting the meters run in a current of a known velocity, or by drawing them through still water. The first method being impracticable, the second was used.

Two of the meters were fastened below a small boat, which was drawn at different velocities, over a known distance in a quiet pond. It was found that the number of revolutions increased with the increase of the velocity.

One of the meters was made by taking the hemispherical cups of a Robinson's Anemometer, made by James Green, and running them in a frame upon two steel points. There was so little friction that the meter would turn in a current of a little over two-tenths of a foot, a second, or one seventh of a mile an hour. D'Aubuison gives the ratio of the resistance of plane surface, to that of a hemisphere drawn through still water to be as 100 to 35, and from this the co-efficient of three used in Robinson's Anemometer is taken. But these experiments show that when the velocity is half a foot a second, the ratio is 100 to 29 nearly, and at four and a half feet per second as 100 to a little more than 41; the mean being about the same as that given above. These quantities do not, however, increase in a direct ratio, but nearly in the curve of a parabola, so that in velocities exceeding three miles per hour, the coefficient should be from two and a half to two. This is an important fact for these meteorologists who are using this instrument for the determination of the velocity of the wind. This coefficient being thus found for each velocity, it is only necessary to multiply the number of revolutions by it to obtain the true velocity of the current.

Assistant Henry is at present engaged in running all the meters used together in the river here, to obtain the coefficient of each machine by comparison with those whose coefficient has already been obtained in the manner above stated.

The maximum velocity of the current was found to be at or a little below the surface, and the velocity at the bottom is probably not over two-thirds the maximum.

The following approximate velocities and discharges of the different rivers is taken from the computations of the work last year. The quantities for the Detroit River are computed.

RIVER.	Maximum velocity.		Mean velocity		Disch'ge cubic feet per second.
	Ft. per second.	Miles per h'r	Ft. per second.	Miles per h'r	
Ste. Marie's	1.921	1.30	0.957	0.66	90,783
St. Clair	4.544	3.09	3.514	2.39	233,726
Detroit	4.000	2.71	3.000	2.04	236,000
Niagara	3.370	2.32	2.258	1.54	242,494
St. Lawrence	1.462	1.00	0.954	0.65	319,943

THE MANUFACTURE OF ARMS IN PERSIA.

FABRICATION OF GUNS.

The manufacture of arms has always been one of the principal industries of Persia. The muskets of the old and celebrated manufacturer Mustapha, are still worth from $400 to $500 each, and all armorers follow the same methods which have been used by thisf amous master For the making of a gun, two old horseshoes are taken together with small pieces of old iron, so that the whole weighs nearly fifteen *sirs*, which is not quite two pounds. In the heating the small pieces are arranged in such a manner that the horseshoes form the outer rim. When a proper degree of softness has been attained they are welded on an anvil. This process is repeated for several times until the iron obtains a length of two feet and a quarter. When twelve such bars are obtained, they are bound together and then welded; the bar obtained is cut in pieces of such a size that four or six will form the desired weapon. These bars are then twisted and welded together, the resulting piece is afterward bent and again welded to one bar which finally is turned and bored.

If the barrel proves satisfactory it is polished in order that the various twist marks may appear, which are produced by the different qualities of iron. It is afterward coated with a paste of two parts of sublimed sulphur and one part of sea salt, and left for twenty-four hours in a warm room, and being cleansed is then ready for sale. The price of a rifle as made now-a-days varies from $40 to $80, and that of a pistol from $18 to $40. These guns generally possess locks but often they are also fired by a fuse. In the southern part of Persia we find the infantry armed with such weapons. Their chief manufacturing place is Laar. This weapon is partly supported by a kind of fork which is fastened at the extremity of the barrel. The percussion guns are exclusively of European manufacture, the best of which are considered to be made in England, which can only be bought by the nobles. The common classes satisfy themselves with the products of native or Belgian art.

The Persians are good target shooters, and very fair sportsmen so far as ordinary shooting is concerned, but they are very poor on the wing.

THE MAKING OF DAMASK STEEL.

The blank weapons consist either of damask, ordinary steel, or iron, of which the smelting of the first is an industry peculiar to Persia. There exist various kinds of damask which we propose to describe as follows:

1. *The Indian damask.* It is made at Lucknow. All the workmen are Persians, one of the manufacturers being known from antiquity. His name is Mirza Hussein Chirazi. The said damask consists of three parts silicate of iron, one part cast iron, and two parts very pure iron. These substances are put in crucibles which contain five to forty *miskals* (25 to 200 grammes); the latter are then set in a furnace and kept therein for six days at a strong heat. Such furnaces are made to contain from 10,000 to 12,000 crucibles. When the metal is solidified they are broken to pieces, the iron being brought in an annealing oven and kept therein for forty-eight hours, where it is left to cool slowly. If this precaution is neglected the damask becomes brittle as glass does, and is then useless.

2d. *The damask of Kaswine* is entirely made in the same way, but instead of common iron the heads of old horseshoe nails are taken.

3d. *The damask of Khorassan.* This is superior to those already mentioned. Since the supremacy of Nader-Chah, who destroyed all its ovens, it is no longer manufactured.

4th. *The damask of Arsindgan, Neres, and Schiras,* is sold for an equal weight of gold, there being very little in existence, as all the furnaces of those places have been destroyed long ago and never rebuilt.

The damask of Khorassan possesses dark designs and is very brilliant. That of Kaswine possesses a gold-like reflex. The designs are intertwisted, presenting in general a series of circles.

The armorers buy the damask, the quality of which they know from long experience. For the purpose of testing it they heat, for instance, a piece to red heat and forge it then to a length of one foot and a half. If scintillation takes place it is considered of a bad quality, and also when the surface does not present a perfect evenness.

Railroad Bridge Across the Mississippi.

On the 7th of November the formal opening of the Quincy (Ill.) Railroad bridge across the Mississippi river took place, making an unbroken railway line from the East, viâ Chicago, to Kansas City on the Missouri. When the bridge at this place shall be finished the through line will penetrate the heart of Kansas. We copy from the Chicago *Railway Review* the following description of the bridge:

"The first stone was laid Sept. 25th, 1867, the last, August 5th, 1868. Its total length, including embankments, from the Chicago, Burlington & Quincy to the St. Joseph Railroad tracks, is about two miles. The draw portion of the bridge spanning the main channel of the river consists of two spans of 160 feet each; and the main bridge consists, otherwise, of two spans of 250 feet, three of 200, and eleven of 157 each—making a total, with the mason work, of 3,250 feet. The embankments and trestle work between are 1,400 feet in length. Bay bridge, 613 feet; one draw, 190 feet long, and four spans of 85 feet each. The bridge is elevated ten feet above high water mark, and twenty feet above low water mark, on stone piers. The masonry and foundations are the work of the Bridge Company, under the direction of the Chief Engineer. The superstructure is of iron, on the Pratt truss principle. Every piece of wrought iron in the ties, links, bolts, etc., was tested in a hydraulic press up to 23,600 pounds to the square inch, and struck with a hammer, while under tension, before being used in the bridge. Theoretically, the strength before the effect of the load becomes apparent in stretching is 28,000 pounds to the square inch; while the ultimate strength is 60,000 pounds to the square inch. The bridge is so proportioned that a train of two locomotives and the heaviest freight cars strain the iron only about 7,500 pounds to the inch."

The tests made were these:

Three of the heaviest locomotives were coupled and placed at rest centrally upon the span 250 feet long, and the deflection or yielding of bridge very accurately observed by means of instruments. The total weight of the load was 300,000 pounds, and the maximum deflection at the center of the span was 2·4223 inches, being one-sixteenth of an inch less than the deflection previously calculated.

The same load was then placed upon a span 157 feet long, and a deflection produced of 1·375 inches, which varied but little from the result of previous calculations.

The three locomotives, still coupled, were then run over the 157 foot span several times, at rates of speed varying from ten to sixteen miles per hour. The deflection produced was 1·406 inches, being an increase of only 3·1 inches over flection while at rest. Probably no severer strain than the above will ever be applied to the bridge in actual use. In each case, on the removal of the load, the bridge at once resumed its previous form.

The strain applied to-day was 5,100 pounds to the square inch of wrought iron, and 5,800 pounds per square inch of cast iron.

On the 157 feet span, the strain applied was 9,000 pounds to the square inch on the wrought iron, and 10,200 pounds to the square inch on cast, being about one-quarter more than the strain produced by the passage of the heaviest freight trains. All the wrought iron had been tested before being used by a strain of 23,000 pounds per square inch. Specimens of the wrought iron which were subjected to the ultimate strain, broke only at from 60,000 to 80,000 pounds per square inch. The total cost of the structure was $1,500,000.

Improvements in Steam Navigation--How they will Affect the Old World.

The London *Spectator* has the following:

"Suppose it true, as many men of mark and science believe, that the next great step may be in sea-going steamers, that international communication may be accelerated as internal communication has been, that we may yet see New York brought within two days' journey of Liverpool. The probability is that in ten years every social condition now existing in Europe would have ceased to exist, that the millions who toil for others, and on whose toil modern society is built, would choose to toil for themselves, would precipitate themselves in a rush, to which all the movements of mankind have been trifles, upon the new world. Suppose the population of Britain and Germany reduced to ten millions each—a change less in magnitude than that which has occurred in many countries—and these ten millions only retained by advantages as great as the new world can offer, what would all the changes of the past half century be to that? This may happen, even without any application of Stephenson's great idea—the one idea he never worked out—that if engineers, instead of trying to increase the power applicable to driving ships, were to reduce the friction which retards ships, the world would speedily be one great parish. This writer, who has seen many countries and lived among many races, seriously believes that of all the dangers to which Europe and European society are exposed none is so formidable as the passion for emigration; seriously doubts whether, if education once spreads in Europe, it will be possible to retain its population cooped up in their narrow and half exhausted corner of the world. We think, we English, that we know what emigration is; but we know nothing about it, have no idea of the changes it would involve if aided by the whole force of the masses then in possession of the supreme political power. Suppose those five-sixths of the Englishmen who now work for others choose to go elsewhere and work for themselves. The change between Waterloo and Sadowa would be very slight compared with the change between 1868 and 1918, and there is not a sensible man in England who will declare that alteration beyond the reach of thought. Why should not emigration in England and Germany attain the height it has reached in Ireland, and the masses insist on aiding it through the national fleets. The Irish would if they had the power, and the British have this year the power conferred on them. We say nothing of a discovery which, if it is ever made, will remold all human society, slowly pulverize all differences among nations, fusing the world into one people, and immediately destroy all existing political arrangements—the discovery of a means of maintaining and guiding a raft ten feet or so in the air; for we cannot resist a totally unreasonable impression that the discovery will be made; that progress will not in our time make that astounding leap. Apart altogether from that, there are physical forces now at work strong enough to change the whole face of the world, by shifting its populations."

The Process of Watch Manufacturing.

Some years since we were very much interested in a work in which the process of chromo-lithography was illustrated by a series of pictures, the first plate showing the impression of one color only, that is, the portions of the picture in which this color was to appear, the next had the impression of another in addition to the first, and so on through some twelve or fifteen different plates, each picture approaching nearer and nearer to perfection, till at last we had the complete and finished whole.

We were reminded of this a few days since by seeing at the establishment of Messrs. Howard & Co., 619 Broadway, the different parts of a chronometer balance wheel of a Waltham watch, commencing with the simple rings of brass and steel in the rough state, and in a series of some ten or twelve pieces, showing the process of manufacture of this delicate part of a watch as made by the wonderful machinery at Waltham.

We had no idea of the many changes this little wheel has to undergo before it is ready for use, and all who are interested in such matters are advised to call on Messrs. Howard & Co., who will take pleasure in showing these articles to those who may desire to see them.

Size versus Numbers.

The Report on Obstetrics of the Medical Society of Illinois, while it states that only 653 births have been reported, humorously says:

"Our Western mothers are only keeping pace with the rapid and extraordinary development in the great West. Our wide spread and deep-soiled prairies, all must admit, produce larger corn, and more of it, than States further east are capable of doing. No one need now be surprised at anything in the great West, especially at large babies in Illinois; for we can feed, take care of, and raise more of them than any other State of equal population on the globe."

The committee is impressed with the belief that children in this country are larger than statistics show them to be in the European States. Four of the children reported weighed at birth 12 lbs. each, two, 14 lbs, and one 17¼ lbs. These are all larger than any reported by Cazeaux in 3,000 births, three of them are larger than any reported by Madam La Chapelle in 4,000 births, or than were witnessed by the celebrated obstetricians Proffessors Meigs, or Hodge. We offer our editorial hat to the State of Illinois

Ornamental Majolica Flower Vases.

Ceramic art is probably older than that of the working of metals; for, while the possession of iron and a knowledge of its uses is assumed to be conclusive evidence of the elevation of a people above the condition of savages, and a proof of their partial civilization, at least, the art of forming utensils and ornaments from clay and baking them to resist the action of the atmosphere and exposure to the weather, is one that the very lowest tribes of the race possess in a measure. Yet while this art is common alike to the savage and civilized conditions of society, only the latter are capable of producing works in plastic materials which charm the eye with their their grace of form and elegance of ornamentation. Grecian art is as perfectly preserved and as worthily represented in the vases, urns, lamps, and other specimens of the skill of the ceramic artist as in the statues and architectural monuments that indisputably prove a high degree of refinement. Although we, to a certain degree, copy the antique in outline, yet taste, and art, and skill in these days are not a whit behind those of the Greeks. In some respects we excel them. This is seen in such products as those we represent in the accompanying engravings, which we copy from *The Workshop*, a monthly, edited by Prof. W. Baumer, I. Schnorr, and others, and published by E. Steiger, 17 North William st., this city. A notice of No. 10 of this monthly appears in another column. We cordially commend the periodical to workmen and manufacturers in every department of art.

The tallest vase in the engravings has a greenish gray tint, glazed, the leaves and violets retaining their natural color and relieved by a dark blue ground on the medallion and bands upon which they rest. The handles are of a yellow, graduating into green towards the lower parts.

The ground of the other is dark blue, glazed, the heads gray, the handles yellow, changing to a reddish tint at the upper parts, and to green at the lower parts. The leaves and flowers of the lily of the valley are of the natural colors.

Grace of form, brilliancy of color, and appropriateness of ornament combine to give peculiar beauty to these specimens.

DESIGNS FOR FLOWER VASES.

Scientific Progress.

Dr. J. Aitken Meigs concluded his inaugural address to the students of Jefferson Medical College with the following eloquent passage:

"A retrospective glance at the scientific progress of the last two hundred and seventy years shows us clearly that the glory of the seventeenth century was the development of the doctrine of universal gravitation and the establishment of the science of astronomy—a science treating of the motions and mutual relations of masses of matter; that the glory of the eighteenth century was the development of physics and chemistry, or those sciences which deal with the relations and reactions of atoms of matter; and that thus far the office of the nineteenth century, owing to the wonderful perfection to which the microscope and other instruments have been brought, has been the discovery of many of the laws upon which the mysterious phenomena of life depend. The great advance of our knowledge in histological and morphological development since the beginning of the present century, coupled with the new doctrine of the forces, has given rise to the growing conviction in the minds of physiologists that we are upon the eve of some great discovery in Biology, which will prove, in the hands of future physiologists, as powerful a means of research as has already been in those of the chemist, the law announced by Kirchoff in 1859, relative to spectral analysis. It may be that this discovery is to be reserved as the crowning glory of the coming century; it may happen, on the contrary, that some busy and ambitious brain, even now within hearing of my voice, is destined to grasp, in all their details, the facts at present in our possession, add to them still others, and suddenly, before the present century has run its course, utter to the world the formula by which they are colligated, and which expresses their true significance. In the present state of scientific progress and unrest who can tell?"

How to Practice with the Velocipede.

London Society gives from the pen of a skillful amateur the following directions for beginners with the velocipede:

Run beside your iron horse, leading it, as it were, with your hand, so as to familiarize yourself with its movements; this will be an affair of a few minutes merely. Then commence practicing with it on a slope, and, after mounting it, let it move forward of its own accord, while you occupy yourself with studying the effects produced by the inclination which you give to the balancing pole or handle of the machine. When you thoroughly understand the action of this, place one foot on the pedal, and follow its movements without assisting them. The difficulty with beginners is to restrain the unnecessary expenditure of muscular force; they ordinarily perform ten times the labor that is requisite.

Next repeat the experiment on level ground, having both feet on the pedals, and working them alternately with scrupulous regularity. Speed is obtained by simply accelerating this movement.

After an hour or two's practice the tyro will be able to accomplish a distance of from thirty to forty yards without running the risk of an upset. Should the machine incline on one side, all that is necessary to be done is to remove the foot on same side from the pedal and place it on the ground. This can of course only be accomplished when the velocipede is of a moderate height, which, by the way, is the proper kind of machine for beginners to make their first essays with.

To alight, both feet are raised from the pedals at the same instant, which has the effect of slackening the speed of the machine; the feet are then placed simultaneously on the ground without the handle being let go.

The tricycle, or three-wheeled velocipede, is easier to guide and safer to use than the bicycle; its speed is, however, less rapid; still, it can be made to pass a carriage going at full trot. As the fair sex largely patronize this vehicle, the seat is more commodious than that of the bicycle, having sides and back of wicker, and a horse-hair cushion to sit upon. The hind wheels, though large, are light, and revolve with facility; the fore-wheel, which is smaller, serves to guide the machine, being acted on by means of the handle, which causes it instantly to turn in the direction indicated by the rider. The pedals are shaped like slippers, which facilitates the movements of the legs, and at the same time admits of the foot being disengaged instantaneously. The movement required to impel the machine is a perfectly natural one, analogous, in fact, to that of walking, that is to say, without the slightest pressure of the foot, and certainly without producing any unusual fatigue, for the motion of the leg develops itself, as it were, until the limb becomes fully extended, entirely without effort.

In addition to all these advantages, the larger three-wheel velocipedes have a lever which follows the line of the eccentrics attached to the pedals and fits on to the axles. By assisting the movements of this lever, the speed of the vehicle is considerably increased, and a simple pressure against it checks the rotatory movement of the wheel and stops the progress of the machine. This lever is, in fact, both a means of impulsion and a break.

Hydro-Carbons for Generating Steam.

The London *Artizan* notices some experiments in utilizing liquid hydro-carbons as a heat-producing power, applicable to the generation of steam. It is known as the Dorsett plan, and instead of consuming the liquid, raises it to a vapor at such a heat as to sustain a pressure of from 30 lbs. to 40 lbs. The grand trial was made on a screw steamer, the *Retriever*, of 90-H.P., and 500 tuns. The engines of the usual overhead or "steam hammer" plan, cylinder 30 in. diam., and 24-inch stroke. The *Artizan* says:

"In applying this system to the *Retriever* everything has been done in a rough and ready manner. A couple of old upright boilers, one about three feet, and the other about two feet six inches diameter, have been pressed into the service and placed on the deck, from which the vapor was conveyed to the furnaces of the steam boiler, by means of one inch unclothed wrought iron pipes. All the firebars were removed from the furnaces and replaced by the layers of perforated firebrick. The boiler of the *Retriever* has three furnaces, in each of which at about the same hight as the fire bars would have been, was placed a double oblong coil of wrought iron pipe; the shape of the coil being somewhat similar to the outline of the plan of the furnaces, only smaller, so that the pipe was from one to two inches distance from the sides of the furnace. The lower of the two coils was perforated by four small holes, or jets, about 3-16th inch diameter; namely, one at each side, and one at each end of the coil. The vapor was caused to pass first through the upper coil of pipe, and thence to the lower, by which means a considerable additional amount of heat was imparted to it just before issuing from the jets. The doors and ash-pits of the furnaces were fitted with perforated plates by which the amount of air could be regulated. The boiler, which is on the usual return tube plan, has eight rows of tubes, but the four upper rows were stopped. At first starting coal is used in the furnaces of the generator, which are about three fourths filled with creosote. As soon as the vapor of the creosote is raised to about to five pounds pressure, it is admitted by means of a small pipe which runs down from the top of the generator into the furnace beneath it, when from that time no more coals are used, as the vapor issuing from a small jet in the furnance performs the required duty. The most advantageous pressure at which the creosote vapor should be used appears as yet to be scarcely determined; in this case it was used at from thirty pounds to forty pounds for the steam boiler.

"A very interesting trial of this system was made on the 12th ult., when the *Retriever* ran from Deptford to a short way below Gravesend and back, a distance of somewhat over fifty miles, without the slightest hitch of any kind. The steam was kept up at the working pressure of fifteen pounds, dur ing the whole time, and with one exception, which was purely the result of carelessness, and which only lasted about a minute, the smoke was scarcely perceptible during the entire journey, and it was evident that this minute quantity was entirely owing to the temporary nature of the arrangements for regulating the admission of air to the furnaces. As regards the merits of this system over coal burning, we cannot venture to offer a decided opinion without more accurate data than can at present be obtained. It was stated that the average consumption of creosote during the trip was thirty-five gallons, while the usual consumption of coals was eight hundred. As the present present price of creosote is less than one penny a gallon, this shows a large direct saving, to which must be added the great saving effected by entirely dispensing with stokers, and the increased carrying capacity of the vessel.

"We believe that this is the first thoroughly practical exhibition of the merits of liquid fuel for steam navigation, and it has certainly, so far, proved a success, as to justify perfecting the various mechanical details, and giving the system a fair trial."

Correspondence.

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

Water and Wind Power at the West.

MESSRS. EDITORS:—The Commissioners of Maine exhibit an immense grand total of water power, which the young state of Nebraska can leave far in the shade with a species of power she possesses, and which is susceptible of development to an almost unlimited extent.

Unfortunately this State, "so far as heard from," is not abundantly supplied with fuel for steam and our streams are not well located for manufacturing purposes.

Fuel here will necessarily be dear until our *planted* forests have time for growth or cheap transportation can bring us coals from the rich mines of our mountains west.

We have no lack of wind force, which can be put to turning our wheels as it passes over our broad plains.

Wind mills are now constructed so as to govern themselves to a regularity of speed, between a good running wind and a gale, not surpassed by the operation of the steam governor. With such mills pumping can be done at no expense of power, and no cost except oil and a few minutes' attention each day to apply the lubricator.

The Union Pacific Railroad Company are now better served with water at their large shops in this city, by a windmill, at nominally no expense, than they were one year ago by steam at a running expense of about fifteen dollars per day. This mill is but partially self-regulating and cost about one-half as much as did the engine.

For grinding grain, and in fact for all machine work which can be done without much attention and hand labor, wind power is both practicable and profitable; but where artisans are employed it is important that the *time* of running should be controlled, and my object in writing is to call inventors to this point. Give us a plan that will "bottle up" power to be used as we see proper.

In good situations here a wind mill will run upon an average of fifteen hours per day of twenty-four hours during the year. Elevating water to drive machinery is objectional from its scarcity, great evaporation, and expense of reservoirs. Concentration of *air* is only limited in capacity by the strength of machinery and power used, and in it we may possibly find the proper element.

Of course when wind is "in season" machinery should be driven by it *direct*, thus avoiding the loss by friction, leakage, etc. Your correspondent who discussed utilizing the sun's power, would find himself far in the rear if he should attempt a race with some of our "gentle zephyrs."

While Holland is kept above water by very rude windmills, why not use our ingenious Yankee devices to float us upon the tide of commercial prosperity? G.

Omaha, Nebraska, Nov. 16, 1868.

Smoke Wreaths.

MESSRS. EDITORS:—In answering J. M. D., of Mass. (see answers to correspondents in No. 20), you do not assign any reason for the formation of wreaths of smoke. Now as I have often asked myself the reason, and taken pains to ascertain the cause, I think that I have succeeded in arriving at a conclusion that would stand the test of experimental research. I will add that I have never heard any reason assigned for it, but have experimented solely with the view of satisfying myself (and in that at least have been successful), and the theory that I have formed is this, viz.:

In order to form a wreath of smoke, there must be another gaseous or aeriform body in contact with the smoke as it issues from the tube. Smoke, especially if "fat" or damp, has an attraction to the walls of the chamber through which it is passing or in which it is confined, unless continually kept moving by a current or blast of air. Now in the smoke stack of a locomotive at rest, the smoke gathers around the sides; a volume of steam from the exhaust forced through the stack with considerable violence has not sufficient time to expand enough to drive out all the smoke ahead of it, but remains more compact and forces its way through the center of the smoke in the shape of a cylinder, dragging out at the same time a certain amount of smoke (by the force of attrition or friction), which smoke, impinging on the external air, is at one blow literally hammered or pressed down to the shape of a nimbus or wreath.

This is my theory of the formation of the smoke wreath, whether from the smoke stack, the cannon, or the human mouth. C. H. DAVIDS.

Brooklyn, N. Y.

Something for Watch and Clock Makers.

MESSRS. EDITORS:—I am a practical watchmaker—or as near it as Americans often arrive—have had fifteen years' experience and have always found more or less trouble with the pivots becoming rusty and stopping the watch, particularly in English lever and American watches; also on the staff of marine clocks. Many times I have cleaned a watch or marine clock and oiled with the best oil I could get (Ezra Kelly & Son's oil), and they would run from three to eight weeks and sometimes longer, and then refuse to go without any apparent cause. I would take them down and find in watches, generally, the lower center bearing under the canon pinion corroded or rusted, so tightly that it would be difficult to remove the wheel from the plate. This occurs on all pivots, but more generally on this than any other pivot or bearing; oftener on the large than the small pivots and on the staff in marine clocks than in watches.

The corrosive substance is sometimes nearly black, but generally of a red hue like crocus, which it appears to resemble, having the same properties in its action on steel; for in every case the pivot is cut and sometimes ruined, even when it is so hard that a file will not touch it. I used to think the fault was with the oil, but by changing the oil used I could find no advantage.

I have talked with a great many watchmakers and found them as much in the fog as myself. Some attribute the difficulty to the action of the atmosphere but can give neither reason nor remedy. D. E. C.

Traverse City, Mich.

Estimation of Size Comparative.

MESSRS. EDITORS:—The extract from the Boston *Journal of Chemistry* concerning our knowledge of magnitudes being obtained only by comparison, which appeared in the SCIENTIFIC AMERICAN of Nov. 4th, is pleasingly confirmed by the following experience: Several years ago, after experiencing for seven weeks the severe monotony of the ocean-like levelness of the plains, on arriving at the Rocky Mountains and winding among the "foot hills," the hills seemed mountains, the slopes precipitous, the valleys gorges, and the roads narrow and of dangerous inclination. One year and a half elapsed before we returned to the plains. In the meantime we had crossed and recrossed the range and stood upon the loftiest peaks of the Sierra Madre. As we returned to the "plains" and recalled the localities which were impressed upon our minds, it was with the greatest difficulty that we could recognize them, they were so changed, for the hills were but mole hills instead of mountains, the slopes were not precipitous, the valleys were not simply passes, and the roads were not narrow or steep. Our first impressions were annihilated and our feelings entertained must be experienced, language cannot express them. At first they were compared with the plains we had just crossed. Now they are compared with the lofty peaks and surroundings of the Snowy Range, thus showing in a pleasing and instructive manner "that our conception of magnitude is comparative." G. E. M.

Georgetown, Cal.

Tempering and Preserving Glue.

MESSRS EDITORS: In addition to former remarks on this subject, I will state that a cement for leather, wood, etc.—at present sold from wagons in different large cities of United States—consists simply of glue boiled in water, with the addition of very finely powdered white lead; this appears to produce a combination even superior to that made with Paris white, which I mentioned before.

Glue is often found to crack in very dry localities, particularly when the objects glued together are not in close contact, but have a thin layer of glue between them; in which case they sometimes fall apart. Very thin layers of dry glue are not only exceedingly hard, but also more or less brittle. This brittleness they do not possess when not extremely dry, and, therefore, to prevent this dry and consequent brittle condition, the addition of a very small quantity of glycerin will accomplish the desired end, for the same reason that for many purposes glass-hard steel is less strong than soft-tempered steel. The quantity of glycerine must be modified according to circumstances.

A liquid glue, far superior to any mucilage, may be made by dissolving glue in an equal quantity of strong hot vinegar, adding a fourth of alcohol and a little alum. This preparation will keep any length of time, when placed in closed bottles, and will glue together horn, wood, mother-of-pearl, etc.

P. H. VANDER WEYDE.

New York city.

Waste of Fuel for Steam Generators.

MESSRS. EDITORS:—You have often written on the subject of steam generation, and pointed out the defects in common boilers. One of these defects is the great loss of fuel, amounting to nine-tenths even in our best boilers. You base your conclusions on the experiments of Favre, Silberman, and Andrews. I think you are mistaken in your conclusion, because you assume that one pound of anthracite coal will yield as much heat as one pound of carbon gas. Carbon gas being the substance burned in the beforementioned experiments. Coal is a solid, and in the conversion of it into a gas much heat will be absorbed.

Again, in those experiments, pure oxygen was used to burn the substances; whereas in ordinary combustion, air (oxygen, nitrogen, vapor of water, and carbonic acid) is used. The three last-named substances would not produce heat, but on the contrary absorb it. Therefore I conclude that one pound of coal would yield as much heat as one pound of carbon gas minus the heat it would absorb in its transformation into gas; minus also the heat which the non-combustible elements of the air would absorb. F. M. H.

East Pike, N. Y.

MESSRS. EDITORS:—Messrs. Morris & Co., at Baldwinsville, N. Y., put a very large Johnson wheel in their shop, with some eight feet head. Under this head the step, which was of lignumvitæ, would not last over two or three weeks, but would *char or burn* out although under water. Various expedients were tried without success. At the instance of Mr. Eli Perry, the shaft (which was of cast iron, eleven inches in diameter), was turned down to about four inches just above the step (which was conical), and since that time, some eighteen months, they have had no difficulty. S. A.

Phœnix, N. Y.

THE SHEFFIELD OF RUSSIA.

A correspondent of the New York *Evening Post* gives the following graphic description of Tula, in Russia, which will be found to be of interest:

"Tula presents the appearance of nearly all the small government towns in Russia; there are the same wide, Macadamized, dusty or muddy streets, without shade trees; the same one or two-story houses of wood and white and yellow stucco; the same green iron roofs, and the same churches with their tall belfries and their onion domes; sometimes a white church with a green or a gold dome, and sometimes a green church with with a blue dome studded with golden stars. From the Church of All Saints, on a hill at the south edge of the town I got a very good view of the whole place, and of the little river Upa, winding through the low rolling conntry. The birch woods were all yellow with the changing leaves, and here and there among the brown fields was one bright green with the winter wheat. I ascended the tall belfry, which, as usual here, stands separate from the church, and after looking around, amused myself with examining the churchyard beneath me. Some of the graves had black, wooden coffin-shaped tombs placed over them, on the end of which was usually painted a figure of Christ or some saint; but most of them had a simple wooden Russian cross at the head—the Russian cross has three transverse bars—a small one to represent the inscription, and another small one placed obliquely to mark the place where the feet rested. The Kremlin, unlike other towns, is placed on low ground on the very bank of the river, and is merely a large square piece of ground surrounded with a high and thick battlemented brick wall, with towers at the corners and over the gates. It contains nothing but two cathedrals, one quite modern, of red brick, the other lofty and square, of white stucco, with curious designs in relief, at least as old as 1606, when it was captured by the False Dmitri, and containing some interesting mosaic pictures still older than the building itself.

"Tula is the center of the cutlery, gunnery and hardware manufactures of Russia; and indeed it seemed as if every house was a hardware shop. I have never seen such quantities of *samovars* (tea machines), pistols, guns, knives, candlesticks, and all imaginable sorts of metal work. The pistols are excellent, and many of them are sold in Paris and London, with English marks, as the work of English makers. The best cutlery is very good, but the ordinary sorts are very bad. A great deal of silver filagree work—an old industry in Russia—as fine as that of Genoa, is made here, and quantities of silver and gold niello work is manufactured, which is sold, to those who know no better, as the genuine production of the Caucasus. As Tula is as well known in Russia as Sheffield in England—there is a picture on the outside of a church at Moscow, representing the Sacrifice of Isaac, in which the knife held by Abraham is marked 'Tula'—I had expected to find, as in Sheffield, large factories with smoky chimneys and all the other disagreeable evidences of a manufacturing town. There is, however, nothing of the sort. The government rifle works is the only large building, except one private gun factory of a medium size. Almost exclusively the whole manufacture of *samovars*, guns, and cutlery is carried on in small shops, where only a single part is made. These various parts are then joined in another shop. The workers on fire-arms reside in a distinct quarter, called *oruzheunoe*, or gun town, formerly a distinct village, but now a part of the city.

"Between the river and the suburb, and just opposite to the Kremlin, are the extensive gun factories of the government, which were erected by an Englishman named Trewheller, and are considered to be among the finest in Europe. The machinery is turned by water brought from the dam in the river in large iron pipes six feet in diameter, and so well protected and heated that the works go as well in winter as in summer. The works are now under the charge of Gençral Standerskjöld, a Swedish Finn, who has the lease under a contract for the manufacture of breech-loaders and the conversion of old rifles. He receives also a compensation from the government for superintendence. The General himself very obligingly showed me through the whole establishment, and gave me an opportunity of inspecting the whole process. Among the machines were some interesting ones of his own invention. Each rifle goes through thirty-eight distinct processes before it is complete. The system now used is that of Carlé, though some rifles are still being converted according to another. The gun of Carlé is a needle gun in principle, simple in construction, and not liable to get out of order. It fires fourteen times in a minute. I have seen it stated that a breech-loader will never be of service in the hands of a clumsy Russian soldier; but the Russian peasant is not half so clumsy as he seems. If he is always breaking agricultural machines, it is through ill-will and dislike to innovation, and not through stupidity. The commonest peasant learns in a day to manage the complicated machines of the cotton factories, and needs no instruction after that. When the guns are finished they are inspected by the proper officers, and are proved by firing five rounds, when each bullet must hit a target ten inches high by six inches wide, the shape of a man's breast. At the recent review by the Emperor, at Warsaw, twelve thousand men fired fourteen rounds in a minute at three hundred paces, and every shot told. The Prussian officers in attendance were greatly delighted and astonished. In this factory three thousand workmen are employed, and six hundred rifles are turned out daily, beside a large quantity of chambers, which are sent to the Caucasus to be used there in the conversion of old rifles. The brother of General Standerskjöld has a large gun factory at Izhev, in the government of Viatka, where he employs twenty thousand workmen. They expect by the end of next year to have finished nine hundred thousand rifles."

THE PARSONS STEEL LINED GUN.

Mr. Parsons' converted 68-pounder gun has been tested at Woolwich with 30 lb. charges of powder, since its removal from Shoeburyness. After firing many rounds, a crack appeared in the cast iron outer tube, and for the present, experiments with the gun have been suspended. So far, the steel tube is presumably intact, though it is probable that further firing would destroy it; and as it constitutes the most costly part of the weapon, it is proposed that it shall be withdrawn from its present envelope, and inserted in another, and heavier, cast iron tube. The endurance so far displayed by Mr. Parsons' guns—that under consideration is the second that has been made—is undoubtedly remarkable, and, in one sense so opposed to all theories hitherto formed respecting the action of gunpowder that it deserves some attention.

The facts are very simple. We have in the Parsons' gun an inner steel tube, which, it is generally admitted, is quite incapable of withstanding, unsupported, even one charge of 30 lb of powder. We have, in the second place, a cast iron envelope so thin and weak that it is all but certain that a single charge of 10 lb. of powder, fired behind a 150 lb. projectile, would blow it to atoms. Steel and iron put together give us a gun, weak to excess in its parts, yet strong as a whole. In this fact lies, we have no hesitation in saying, one of the most singular problems ever offered for solution to the artillerist, or the engineer. If it could be shown that one of the two elements of the gun could alone withstand half the strain due to a 30 lb. charge, and the other element the other half, we could understand how, when put together, they could withstand the total strain due to the full charge named. But as a matter of fact, neither the steel tube, nor the iron tube alone, could bear the bursting strain of a 15 lb. charge, fired behind a 150 lb. shot. How is it, then, that when combined, they withstood 30 lb. charges so long?

In attempting to solve this question it is quite unnecessary, in our opinion, to consider for a moment the elaborate mathematical investigations which have been carried out by others, in the endeavor to find a reason for the endurance of converted cast iron guns. These, each and all, so far as we are aware, have been conducted with a view to determine how much of the strain due to an exploding charge is resisted by the steel and how much by the iron. Inasmuch, however, as no mathematician has proved that either element of a converted gun, will bear half the strain of the maximum charge which the compound gun will endure, we regard their method of reasoning, and their calculations as, so far, wide of the mark. If we find that no single engine possessed by a railway company, will draw fifty loaded trucks up a given incline at all, while two engines will take one hundred similar trucks up the same gradient at rapid pace, it is a matter of little importance to consider what share of the performance each separately fulfills; and if we further find that the tractive force is actually in excess of that deduced from calculations based on the pressure of steam, and the space passed through by the load and the pistons respectively, then the calculations must be regarded as of little or no value in the face of facts, which disprove their accuracy, or demonstrate that some element has been overlooked by the mathematician; some element, that is to say, which only operates when the locomotives combine their efforts, and which has nothing whatever to do with the isolated exertions of either. That some at present obscure influence of powér, operates in the compound gun to resist disruption we have no doubt whatever; but to believe in the existence of phenomena, and to explain their causes are two different matters, and the endurance of the Parsons' gun depends, we think, on causes not yet defined or properly investigated.

Mr. Parsons' gun, weighing but seven tuns, or thereabouts, has withstood a test which has sometimes proved too severe for guns weighing twelve tuns. The steel tube of the Parsons' gun is practically the same as the steel tube of the 12 tun gun. The difference lies in the envelope alone, and this, in the Parsons' gun, consists of cast iron, in some places not more than a couple of inches thick, and in no place nearly so thick as the wrought iron guns with which it compares, in one sense, favorably. Taking the facts as they stand, we are irresistibly driven to the conclusions, either that the tensile strength of wrought iron in guns is not so great as that of cast iron, or that the metal in a gun has duties to perform, to the successful discharge of which, great tensile strength may not be essential. The first hypothesis is disproved by facts; the second we can only examine speculatively, because there are few or no facts on which to base our reasoning, other than the main fact, that a gun which, according to theory, ought to have long since gone to pieces, still remains together, and probably in a condition to fire moderate service charges for some time to come.

The first point which presents itself for notice, is that if the thin outer envelope of the Parsons' gun is sufficiently strong, then the jackets ordinarily fitted on the steel tubes of wrought iron guns are immensely too thick. Yet practice tells us, in language which there is no mistaking, that this is not the case. Are we to assume, then, that the Parsons' envelope is too thin? Again practice steps in, and says, "No." How shall we reconcile facts so conflicting? In dealing with the question we must consider the nature of the strains to which a gun is exposed, and the manner in which its various parts resist them. We have already, for the moment, rejected mathematical investigation, and they would be out of place in an article like the present dealing, as it does only with broad facts, and more or less crude speculations. We shall consider the strains to which a gun is exposed as twofold in character. The first is strictly tensile, the second it is not easy to characterise by a single word or phrase. If we term it a jarring strain, we shall, perhaps, not be wide of the mark. If we strike a girder, supported at both ends, about the middle of its length, with a heavy hammer, the tensile strain thrown on the lower web may be very small. Reasoning by analogy, and regarding the action of powder as being conformable with the theory of Lynal Thomas, and the experiments by Piobert, we arrive at the conclusion that—especially when a quick-burning powder is used—no tensile strain whatever is thrown upon the outer rings of a gun, the rending force being concentrated on the inner tube, for the simple reason that the wave of transmission of force is not propagated quickly through the metal. According to this hypothesis, it matters nothing whether the outer envelope of a gun does, or does not possess much tensile strength, so long as the inner tube does. The theory is supported by the results of experiment with the Parsons' gun. If, however, we suppose the inner tube to be so weak that it gives way at once by stretching, then the strain will be transmitted immediately to what we may term the next zone of resistance, and if this lies in the outer envelope, then the outer portion of the gun will be exposed to a tensile strain. Furthermore, the rate with which a wave of force transmission travels through various substances, probably varies very considerably with the nature of the substance. On this latter point, evidence derived from direct experiment is much wanting.

Now, the nearer the zone of maximum resistance can be kept to the central axis of the gun, the better. Guns lined with steel tubes fulfill this condition admirably. Hence their success. When we hoop a case iron gun outside, we transfer the zone of maximum resistance to the furthest point from the center. Hence the failure of the Parrott and Blakely systems. We have reason to believe that the thick inner steel tube of any modern gun, whether wrought or converted, possesses in itself sufficient tensile strength to resist the charges ordinarily used. Mr. Parsons' tube, out of its case, would, were one condition fulfilled, to which we shall come in a moment, have stood the tests to which the gun, as a whole, has been exposed with success. Indeed, the bursting force which the existing envelope can withstand is so small that it did little or nothing to preserve the inner tube.

So far we have dealt with facts, or theories ordinarily and correctly received as demonstrably true. We have now to enter on the regions of mere speculation. We have called the second strain to which a gun is exposed a jarring strain, and the precise effect of jar on metals, and other substances, is not fully understood, simply because it has never been properly investigated. It appears to act on the internal atoms of a metal, not by overcoming the attraction of cohesion, but actually by annihilating that attraction for the moment. We may cite a few instances in point. By suddenly striking a flat vessel containing mercury, the metal may be separated into a multitude of little globules; cast iron and stone may be absolutely ground to powder by the explosion of some fulminates. A very moderate blow properly, and sharply delivered, will sometimes crack a large casting. It is generally assumed of the latter phenomenon, that portions of the metal were previously in a state of high tension, owing to contraction; but there is no reason for assuming that this is always the case. The action of jar on a metal is well illustrated by striking a flask rammed with sand. The particles of the sand separate from each other immediately, and the whole falls out. We have not space to prolong our consideration of the effect and mode of action of jar. Suffice it to say that its tendency is to reduce the metal to its component particles, atoms or crystals.

Let us apply this to a gun. If we fire a heavy charge in a steel tube alone, the tube will be broken—or burst, in common parlance—not by the internal strain overcoming its tensile strength, but by the jar; and this statement has been borne out by observed facts, which we shall not stop to cite. Put the tube into another of any material which will absorb the effects of jar, and the tube will stand. Reasoning on this hypothesis, we may suppose the tube in Mr. Parsons' gun saying to the outer envelope: "A charge has been rammed home within us, and we are going to be exposed to two violent attacks, one a bursting strain, the other a jar. If you will only take care of the latter, I am competent to deal with the former." If the theory embodied in these words be correct, great tensile strength is not required in the outer portions of guns having thick steel inner tubes. With iron inner tubes the case is different, and Major Palliser's failures are, in a great measure, due to the circumstance that he used iron inner tubes—a mistake which Mr. Parsons avoids.

Are we to assume, then, that guns should have cast iron, instead of wrought iron envelopes? Certainly not. In the converted gun there is but one zone of resistance; in the wrought iron gun there may be several. Besides this, cast iron is inferior to wrought iron, because it is less able to withstand external violence, as inflicted, say, by the blow of an enemy's shot. Furthermore, it is not certain, or even probable, that cast iron is the best material that can be used in neutralising the effects of jar; its great advantage lies in its homogeneity. In order to settle the relative value of the two materials—cast and wrought iron—let a steel tube, like that used by Mr. Parsons, be similarly fitted in a wrought iron envelope of the same weight as a re-bored cast iron gun. If the work is done with care, the result will be more satisfactory with wrought, than with cast iron.

In conclusion, we must beg our readers to observe that there is one way of solving the mystery connected with the endurance of the Parsons' gun. This lies in assuming that there is in reality, no mystery at all, and that we are as far as ever from the acquision of a thoroughly trustworthy system of utilising our cast iron guns by conversion. The endurance of the gun has, no doubt, been very great—for a converted gun; but, absolutely, the performance is nothing to boast of. Mr. Parsons has done not a little to show that a good many light trifles may be made from our old 68-pounders; but it remains to be proved that uniform results, such as they are, can always be obtained, and that light rifled guns will be useful to us when we have got them.—*The Engineer*,

[The gun, a 68-pounder, 96 cwt., burst at the 33d round, the charge being 30lbs of large grained pounder with a 150 lbs shot—Eds.

Modern Improvements in the Preparation of Fat for the Manufacture of Soap and Candles.

For the Scientific American.

CHEMICAL COMPOSITION OF FAT.

The manufacture of soap and candles is a very ancient branch of industrial art; notwithstanding this, very few improvements were made in it before the chemical nature of fats and fatty oils was discovered by Chevreul in the beginning of this century. He discovered that these substances have a chemical composition similar to many minerals and chemical compounds; namely, that they consist of acids combined with a base. In the same manner that, for instance, gysum consists of the base, lime, combined with the acid, sulphuric acid; or saltpeter consists of the base, potash, combined with the acid, nitric acid. So all fats and fatty acids consist of a base, glycerin, combined with one or more acids, called stearic, margaric, and oleic acids.

THE MAKING OF SOAP.

In the manufacture of soap we simply combine these fatty acids contained in the fat, with a stronger base, usually potash or soda. This is best done by boiling the fat first with a weak solution of the alkali, and afterward adding a stronger solution; the glycerin being the weaker base is driven out; in soft soaps, it remains in the moisture; in the hard, soaps it is more or less perfectly removed.

Of the acids named the stearic is the hardest; it melts at 157 deg. Fah., and gives the hardest soap. The margaric is less hard, melts at 144 deg. Fah., and gives softer soap. The oleic is fluid at the common temperature and produces an inferior very soft soap. In regard to the base, the potassa produces much softer soap than the soda, and is required in larger quantity than the soda, in order to accomplish the saponification of the same amount of fat, in the proportion of 47 to 31, which are the respective atomic weights of those two bases, representing the quantities required to saturate acids.

The chemical name of fat would thus be stearate, margarate, or oleate of glycerin. All fats contain the three acids, but in different proportions; hard tallow and lard, contain the most stearic acid; human fat contains much margaric acid; and fatty oils contain an abundance of oleic acid. When boiling these fats with a strong solution of potash or soda, we form soap, of which the chemical name, therefore, would be stearate, margarate, and oleate of potassa or soda, all with more or less glycerin; and according to what has been remarked above, the hardest of all soaps is the pure stearate of soda, the softest is the oleate of potassa.

There is a great advantage in using these fatty acids in making soap, over the undecomposed fats themselves, as they require not so strong solutions of the alkalies, they unite much more readily in shorter time and at lower temperatures; even boiling may be dispensed with, and besides they produce harder and more valuable soaps by the absence of glycerin.

OLD PROCESS OF MANUFACTURING OF GLYCERIN.

We may separate the glycerin from the fats by combining the fatty acids with a base, which makes an insoluble soap; for instance, lime, or better oxide of lead. In the last case the soap is stearate, margarate, and oleate of lead, and is precipitated in the liquid which holds the glycerin in solution, which liquid is separated, and by evaporation of the water is concentrated. This is the old way of making glycerin, and such glycerin is usually contaminated with lead, and unfit for many purposes for which pure glycerin is required.

OLD PROCESS OF MANUFACTURING FATTY ACIDS.

We may separate the fatty acids from common soap, by adding a stronger acid, diluted sulphuric, acetic, etc. This acid will combine with the base potash or soda, forming a soluble salt, the stearic, margaric and oleic acids are set free, and being insoluble and lighter than water will float on the liquid. Also this is one of the old ways of preparing these acids, but now gone out of use by later inventions.

DISCOVERY OF THE PRINCIPLE THAT WATER, HEAT, AND PRESSURE WILL DECOMPOSE FATS.

In 1822, it was found in England that in a steam engine of Perkins, which worked under very great heat and pressure, and in which the steam condensed in cylinder and air pumps was continually returned to the boiler, the fats and oils abundantly used for lubricating the piston and cylinder became, by the action of the hot water and steam, decomposed into other substances, which were analyzed by Faraday, who pronounced them to be identical with the glycerin and fatty acids of Chevreul, and the result of this investigation was published in the London Philosophical Magazine and Journal in 1823, under the title: "*change of fat by water, heat, and pressure in Perkins' steam engine.*

About thirty years elapsed before any one took advantage of this discovery, till about 1850 the use of superheated steam was put into use in Germany to decompose the fats into acids and glycerin. During the following ten years different arrangements of apparatus were patented here and in Europe, to accomplish the same purpose with water, heat, and pressure, as announced by Faraday in 1823. The earliest of these particular arrangements, patented in 1854, was by experience found impracticable, but another of somewhat later date, was extensively introduced; its peculiar feature being to keep the hot water and fat in a permanent emulsion or mixture, by a very ingenious and simple system of circulation. In strong copper vessels, hermitically closed, and kept at a temperature of 330 deg. to 370 deg. Fah., and a consequent pressure of 7 to 12 atmospheres, the decomposition of the fat is accomplished in the course of 8 to 10 hours. The mixture of fat and water is then drawn off, when it is found that the acids above float on the top, and the water holds the glycerin in solution, which then by evaporation is concentrated, and by subsequent treatment purified.

A lower temperature may be employed for this decomposition, only the operation lasts much longer; for instance at a temperature of 212 deg. or a little above, the separation is only accomplished in several days or even weeks. At the common temperature even, an imperfect decomposition of fat takes place when moisture has access. It is this which partially causes the so-called rancidity of fat; and the bleaching of common tallow candles, by exposure to air and moisture, is such a decomposition of the fat, which, however, in this case is only very superficial.

FORMATION OF ACROLEIC ACID.

At a higher temperature, for instance 500 deg. F., a destructive change takes place in the fats, the first substance formed being called acrolein and acroleic acid, which possesses the very disagreeable odor of burnt fat in the highest degree.

SEPARATION OF THE FATTY ACIDS.

The three different fatty acids, the stearic, the margaric, and the oleic are mutually separated, first from the oleic by pressing in bags at the common temperature, and the margaric from the stearic by pressing it out at a temperature of 150 deg. Fah., which melts the first but leaves the last in solid condition.

As the oleic acid is a very inferior fuel, gives a poor light, and by its acidity cannot be employed for lubricating machinery, it is mostly used for soaps, and also for greasing wool in woolen factories. The stearic acid either alone, or mixed with the margaric is employed to make the so-called stearin candles, which in fact are stearic acid candles, as stearin means the combination of the acid with the base glycerin, or the stearate of glycerin.

TEST FOR FATTY ACIDS.

To distinguish candles made from these acids, or adulterated with them, from those made of pure wax, spermaceti, or paraffin, the acid reaction of the melted fat on red litmus paper is the most simple test.

The stearic acid is also soluble in alcohol, which is not the case with fat, oil, wax, spermaceti, or paraffin.

The glycerin has found numerous very useful applications, which are increasing almost daily, and form a subject for a separate article.

Quadrature of the Circle.

In former days mathematicians devoted much time and labor to the question of determining the ratio of the diameter of the circle to its circumference. Archimedes found that it was nearly as 7 to 22, and this ancient solution is still very useful for ordinary purposes. Later researches brought it at length to such a point of precision that it would be idle to seek any further, the ratio being as a unit to 3·1415926, with a continuation of 120 decimals more. It follows, then, that any attempt to make the diameter go exactly into the length of the circumference, or to represent their ratio by an exact fraction, is simply ridiculous. As such a solution, were it possible, would enable us to make a square containing the exact surface of a circle, this problem is commonly known under the name of quadrature of the circle. At last week's sitting of the Academy of Sciences, says *Galignani*, the perpetual secretary announced that a newspaper had recently revived an old story to the effect that the Academy was in possession of a considerable sum bequeathed to it as a reward for any person who might discover the quadrature of the circle. He, therefore, suggested the propriety of again publishing the decision the Academy came to in 1775, of never more devoting the slightest attention to the solutions that might be sent in of the following problems: The duplication of the cube, the trisection of the angle, perpetual motion by means of a machine, and the quadrature of the circle. It justified this course as regards the latter, by remarking that many weak-minded persons, utterly ignorant of mathematics, and laboring under the impression that large sums were ready to be handed over to them in case they succeeded in solving that problem, devoted their time to it, utterly neglecting their regular business and the interest of their families, and even occasionally losing their reason by following such a vain pursuit. M. Bertrand stated that the belief in the promise of large prizes by the Academy for the solution in question had been propagated by very serious works. The "Biographie Générale," for instance, had stated that M. Rouille de Meslay had left the Academy 120,000f. for that purpose. He stated that in the eighteenth century an inventor of the quadrature actually summoned D'Alembert before the Parliament in order to recover that sum.—*London Building News.*

STEAM pressure in the boiler, and steam pressure on the engine piston, are not necessarily alike. Allowance must be made for condensation in conveyance by pipes.

MRS. G. W. PARKER certifies to having earned over $600 in a year, with one needle, on a Wheeler & Wilson Sewing Machine.

Recent American and Foreign Patents.

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

SLEIGH BRAKE.—Milton Satterlee, Richland Center, Wis.—This invention is a neat, cheap, and easily operated adjustable brake, which can readily be attached to any sleigh or sled.

FOLDING BEDSTEAD.—C. P. Alling, Jr., Sylvan, Wis.—This invention has for its object to furnish an improved bedstead, which shall be so constructed and arranged that the bedstead may be compactly, quickly, and conveniently folded for storage and transportation, and in such a manner that the frame of the bedstead may be protected by the slat frames that form the bed bottom from injury while stored, or while being transported.

PAPER RULING MACHINE.—William C. Smith, Brooklyn, N. Y.—This invention has for its object to furnish an improved attachment for paper ruling machines, by means of which the paper, while passing beneath the pens, may be kept smooth and free from folds or wrinkles, so that the ruled lines may be uninterrupted.

ELEVATOR.—Thomas B. Simonton, New York city.—This invention has for its object to furnish an improved elevator for use in warehouses, stores, manufactories, etc., which shall be simple in construction, convenient and safe in use, and unlimited in power.

COVERS FOR CIRCULAR VESSELS.—John Kline, Rochester, N. Y.—This invention consists of a semi circular cover, the latter being affixed in a groove in the inner surface of the vessel. The movable cover, A, turns on the bolt or screw, and slides in a groove, cut or otherwise formed on the sides of the vessel.

REVOLVING CUTTER FOR PLOWS.—Marshall Sattley, Taylorsville, Ill.—This invention has for its object to furnish an improved revolving cutter for plows which shall be simple in construction, effective in operation, and not liable to get out of order.

DOOR FASTENING.—A. F. Kitchen, Shelton Depot, S.C.—This invention has for its object to furnish an improved fastening for the doors of corn cribs, and other outbuildings, which shall be so constructed and arranged as to protect the said outbuildings from the depredations of thieves.

STOVE.—Mrs. Sarah M. Clark, Beaver Dam, Wis.—This invention has for its object to improve the construction of cooking stoves, so as to make them more convenient and effective in use.

CULTIVATOR.—Theophilus Arndt, Mount Joy, Pa.—This invention has for its object to furnish an improved cultivator which shall be so constructed and arranged as to be conveniently and readily adjusted for performing the various operations necessary in cultivating corn at the various stages of its growth.

HARROW.—Moses Atwood, New Sharon, Iowa.—This invention has for its object to furnish an improved harrow, which shall be so constructed that, should the teeth become clogged, or strike an obstruction, it may be easily and quickly cleared without its being necessary to raise the harrow frame from the ground.

ROOT CUTTER.—G. S. Perfater, Camp Point, Ill.—The object of this invention is to provide an attachment for cutting small roots, vines, and stubble, in front of plows, and is designed to be attached to a plow in the manner hereafter to be set forth. It consists of a revolving cutter, working in the rear and above a fixed cutting point, and also working in a slit in the curved shank, forming part and supporting the fixed cutter, whereby the roots and vines will be first partially severed by the fixed cutter, and afterward completely severed by being drawn between the revolving cutter and the aforesaid curved shank in which the latter works.

BLANKS FOR SPADING AND OTHER FORKS.—J. C. Richardson, Ilion, N. Y.—This invention consists in punching or cutting the blanks out of a plain strip of metal, in such a form that no metal is wasted, and which form facilitates the process of finishing the blank.

COMBINED HAMMER AND NAIL HOLDER.—Ransom W. Green, Bradford, Pa.—This invention consists of the arrangement on the handle, near the hammer of a fixed and a sliding clamping jaw, the latter being provided with a spring for causing it to clamp the nail, and a thumb piece for retracting it. It is connected to the handle by a bent strip of sheet metal whereon it slides back and forth, for clamping or releasing the nail.

EXHAUST GOVERNOR.—Samuel Trumbore, Easton, Pa.—This invention relates to improvements in governors for regulating the speed of engines used for exhausting gas from hydraulic mains in gas works, whereby it is designed to provide a quicker and more reliably acting governor, such as are actuated by the pressure of the gas in the said mains, for regulating the speed of the engines used for exhausting the same.

RAILROAD RAIL.—Henry Zahn, Toledo, Ohio.—The object of this invention is to provide a railroad rail combining several advantageous qualities. It consists in forming the rail in two parts, namely, a solid bar or rail proper, supported by a hollow base of triangular section, and having a longitudinal opening along its upper part into which a tongued rail fits.

HORSE POWER.—Milton Fisk, Sparta, Tenn.—This invention consists in the arrangement of a table to be moved around the vertical axis of a fixed bed by the horse, said movable table carrying a counter shaft and gearing deriving motion from a wheel secured to the fixed bed, and communicating it to a central spindle which may serve as the spindle of a set of stones on the top of the movable table, or as a shaft for conveying motion to other machinery when the upper stone is removed and another section shaft coupled thereto.

MACHINE FOR CLEANING ENTRAILS.—John A. Huss, Louisville, Ky.—This invention relates to the cleaning of animal entrails and so preparing them for the manufacture of sausages and other articles of use. It consists of two rollers revolving in contrary directions and armed with scraping edges affixed radially around the surfaces of the said rollers, together with other devices perfecting the whole.

DEVICE FOR HOLDING DOORS OPEN.—W. W. Green, Jr., Janesville, Wis.—The object of this invention is to prevent the door or the knob of the lock from marking the wall by striking against it when the door is swung open and also to catch automatically and hold the door open. It consists of a knob bearing a forked spring catch affixed in the end of a knob affixed to the wash board or surbase of the wall, in a suitable position to enter a socket plate affixed in the bottom part of the door.

MUSKETO NETTING.—Charles B. Seaman, Honesdale, Pa.—The object of this invention is to provide a simple and convenient apparatus for excluding musketoes or flies from sleeping persons. It consist of a rectangular frame of wood of suitable dimensions to inclose a person, and provided with several wooden or wire bows arising therefrom, and longitudinal rods over which a musketo netting is stretched.

DOG POWER MACHINE.—A. W. Hager and J. H. S. Grove, Waverly, Iowa.—This invention relates to machines for utilizing dogs by causing them to drive light machinery, as churns, washing machines, grindstones, and the like.

TENONING MACHINE.—Wm. Gilmore, Hudson City, N. J.—This invention consists in the arrangement of a sliding clamping carriage on a table, and a pair of vertically-reciprocating cutters on a suitable frame and operated by foot power.

POUNCE HOLDER.—Robert Cushman, Pawtucket, and John R. Dennis, Central Falls, R. I.—This invention relates to a new instrument for closing the pores of paper after the same have been opened by an eraser, so that the ink may not run on such erased parts of the paper. It also consists of a handle to which a bag is fastened that contains rosin and chalk, or such other material in a powdered state, by which the pores will be closed, the powder having the color of the paper to be smoothened.

PLANT PROTECTOR.—Dr. J. M. Hurt, Blacks and Whites P. O., Va.—This invention consists of a hollow cylinder made of any suitable material and size, with a glass top near one end, and perforated for a suitable proportionate part of its length from the end having the glass cover which is to be set over the plant for the purpose of protecting it. Patented Oct. 27, 1868.

SPUR FOR ICE AND OTHER PURPOSES.—C. F. Wieland, Darmstadt, Ill.—The object of this invention is to provide a simple, convenient, and effective spur or creeper, so-called, for walking on ice or inclined roofs of houses. It consists, in general terms, of two U-shaped metal plates; one constituting the heel plate, and the other which is pivoted to it in such a manner as to fold back on the heel or forward under the sole of the shoe, gears pointed studs which enter the surface walked on, and thereby prevent the wearer from slipping. A coiled spring is arranged on one of the hinge platies of the movable part and is enclosed within a case affixed to the heel plate. This spring keeps the movable part upon the heel when not wanted for use, and a spring catch device retains the movable part under the sole of the foot when in use as a creeper.

ADJUSTABLE HOLDBACK AND EXTENSION POLE FOR WAGONS, SLEIGHS, ETC.—W. W. Rexford, Loch Sheldrake, N. Y.—The object of this invention is to so arrange the holdback on a carriage pole that it can be moved backward and forward on the pole, so as to be adjusted to different kinds of harness and to horses of various sizes. It further consists in attaching the holdback projection or ear to a tube which slides on the front end of the carriage pole, and which can be locked to the pole in any desired position by a suitable spring catch. The invention also consists in fitting around the front end of the pole, and in securely fastening the same, a metal tube which has a groove or feather corresponding to a feather or groove on the holdback tube, and which has perforations to receive the aforesaid spring catch.

BOTTLE-FILLING MACHINE.—Peter M. Sherwood, New York city.—This invention relates to improvements made in a bottle filler, for which Letters Patent were issued to Theodore Cochen, dated June 5, 1866.

SAW COTTON GIN.—William Sutton, Washington, Ga.—This invention relates to a new and useful improvement in the construction of hoppers for saw cotton gins, and also in a new and improved construction or arrangement of the breast through which the saws work, whereby several advantages are obtained over the ordinary saw cotton gin in use.

LEVER WATCH MOVEMENTS.—William Borthwick Smith, Coventry, England.—This invention consists in an improved construction of lever watch movement or frame, with the application thereto of a T-lever escapement (detached or otherwise) working in a straight line or at a slight divergent angle, and having the same action as in the ordinary construction.

STONE PRESS.—James W. Gaines, Clarksville, Texas.—This invention relates to a new and improved press for mill stones, whereby the grain is better distributed than usual in passing between the stones, the grain more thoroughly ground and a larger product of flour obtained from a given quantity of grain.

SEED SOWER.—Gottfried Rank, Greenleaf, Minn.—This invention relates to a new and improved machine for sowing seed broadcast, and it consists in a means for scattering the seed and protecting the same from the action of the wind while being sown or scattered upon the ground.

COMBINED CRUSHER, HARROW, AND ROLLER.—John Simpson, Charleston, Ill.—This invention relates to a new and improved device for crushing, harrowing, and rolling the soil for the purpose of rendering the same light and pliable to favor the growth of crops.

WATER WHEEL.—S. J. Thomas, Dawson, Ga.—This invention relates to a new and useful improvement in the buckets of water wheels and it consists in the constructing and arranging the buckets in such a manner that the best possible effect is obtained from the reactive force of the water.

WATER WHEEL.—Wm. E. Tate, Cambridgeport, Mass.—This invention relates to a new and improved water wheel which is also applicable for measuring water or may be used as a water meter.

FOLDING CHAIR.—Adam Collignon, Closter, N. J.—This invention relates to chairs that are made to fold up whereby, they are rendered much more convenient for storage and transportation than chairs of ordinary construction.

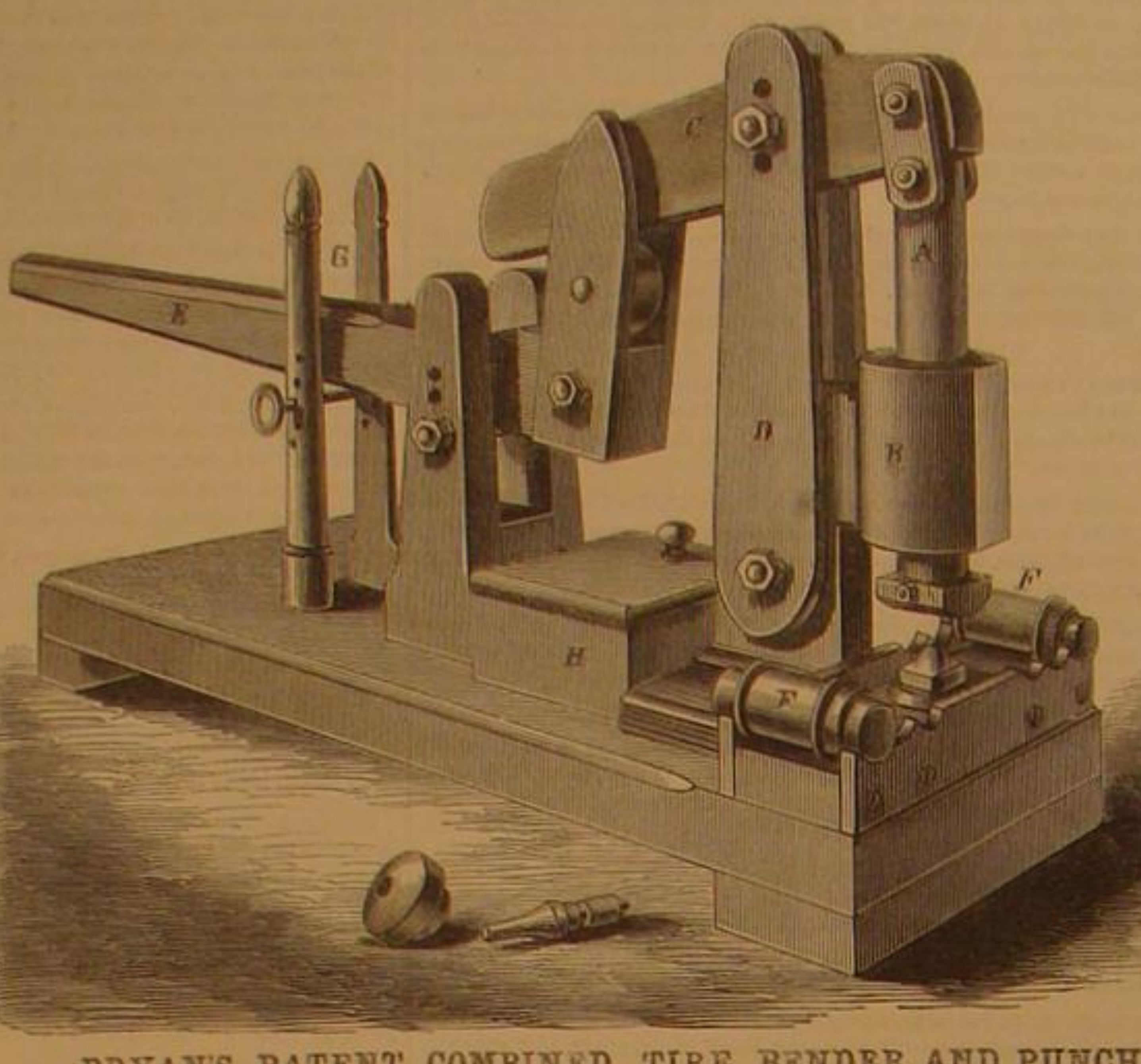
HOT AIR FURNACE.—S. J. Hare, Louisville, Ky.—This invention relates to improvements in furnaces for heating air for warming buildings and consists in the arrangement of drum and air passages in combination with the air box and combustion chamber.

VARIABLE CUT-OFF.—Thomas Hansbrow, Sacramento, Cal.—This invention relates to a new and improved method of controlling the speed and action of steam engines, whereby the quantity of steam supplied to the cylinder is proportioned to the work.

Improved Tire-bending and Punching Machine.

The objects of this machine are to bend either light or heavy iron when cold, to bend it to any given diameter or radius, and to punch cold iron, the machine being operated wholly by hand. It is a common adaptation of the lever so arranged in its parts as to yield great power.

The plunger, A, works vertically in a head, B, and its upper end is connected to the lever, C, by toggles, the lever being suspended between the upright pivoted ears, D. A hand lever, E, carries a roller on its inner end, as seen, upon which the long arm of C, rests and by which it and the plunger is operated. For bending tires or iron bars for any purpose the cylindrical formers, F, are placed in bearings on the rest, and a die, having a set screw in its top with convex head, is dropped into a hole directly under the plunger, A. Then, for bending tires, a pattern, termed by wheelwrights a "fellow pattern," of the curvature of the tire to be bent, is placed upon the formers, F, with convex edge downward; the set screw in the die is then turned to touch the under edge of the pattern, and the plunger with its rounding head is brought down toward the set screw, having a space between of the thickness of the iron to be bent, the descent of the plunger being governed by a pin passed through the guides, G, for the handlever to strike upon when brought down. The set screw gage may now be removed and the machine is ready.



BRYAN'S PATENT COMBINED TIRE BENDER AND PUNCH.

The formers, F, have on one end a fixed flange and on the other an adjustable one, to guide the iron bar or tire on a straight line in passing under the plunger. The inventor says that one man of ordinary weight can bend, by means of this leverage, tires four inches by one inch, or three by one and a half inches, when cold, while another person guides the tire bar. In punching, dies and punches of any form may be used, the die fitting in a hole under the plunger and the punch in a hole in the plunger and held by a set screw. Specimens of the punch and die are shown in the engraving on the floor. The box, H, on the platform of the machine is a receptacle for the dies, punches, gages, etc.

Patented June 2, 1868, by James M. Bryan, who may be addressed for State, county, manufacturing, or shop rights, at Penningtonville, Chester county, Penn.

Oil and White Stones--Where they Come From and Where they are Manufactured--A Large Establishment.

The New Albany *Commercial* says it is not every carpenter, silversmith, or other mechanic that uses the fine oil and white whetstone to give edge to his tools, that knows where these stones come from and where they are manufactured; and there are probably but few persons, even in New Albany, that know any more about these matters than the artisans we have referred to. We, however, propose to enlighten them.

Oil, or Ouichita stone, is the material from which are manufactured the oil stones used by carpenters of all classes for giving a fine edge to their plane bits and other edge tools. This stone is found in Arkansas, the quarries being situated near the celebrated Hot Springs of that State. The stone is quarried with great care into blocks of from two to four feet square, or of irregular shape, according as it lies in the quarry. From the Hot Springs it is shipped to Little Rock, where, at the present time, it is sold at the rate of three cents per pound in the rough, the purchaser being charged with all the expenses of its shipment from that place.

The white stone comes from the same quarries as the oil stone, but from a different vein. This stone is much more costly, and of a much finer grain than the oil stone. It is used by jewelers, engravers, and manufacturers of surgical instruments, for sharpening the instruments used and manufactured by them. It is also used for sharpening sewing machine needles, and all delicately pointed instruments, and is much more costly than the oil stone. We believe that the quarters at the Hot Springs are the only ones producing the oil and white stone in America, and have proved an immense fortune to the proprietors.

There are in America but five manufactories of oil and white stones. One is at Jeffersonville, two at New York, one at St. Louis, and one at New Albany. The manufactory in this city is more extensive than all the other four combined, and purchases more stone and turns out more product than the other four put together.

Its annual product is of Ouichita, or oil stones, one hundred and five thousand pounds; of white stones ten thousand pounds, and Hindostan stones one hundred and eighty thousand pounds. The value of this product is immense. The Hindostan stone comes from a quarry in Orange county, Indiana. To give an idea of the value of white stone, we will state that we are informed that seven thousand of the sewing machine whet stones were recently shipped to Albany, New York, in a little box eight inches long, eight inches wide, and eight inches deep, for which $70 per thousand were paid, or $490 for the contents of this one little box.

The Illinois Industrial University.

The *Weekly Pantagraph*, in discussing the inapplicability of the course of study adopted in the above institution to the wants of its students, makes the following very humorous remarks, called forth by a communication to the Chicago *Tribune* by its correspondent, "Rural":

We rather like that idea of abolishing the English, as it appears to be the only sure mode of getting clear of an unnecessary amount of Latin; make Latin the mother tongue, and we should then study English because it was a dead language. But after all, does not Rural under-estimate the value of a classical education exclusively for farmers? The Course of Study, as arranged for the University, includes the following:

French, German, Latin, and Greek languages and literature, astronomy, history, ancient and modern, political economy, civil polity, moral economy and law, rhetoric, philosophy, logic and mental science, ethics, history of science and philosophy, composition, elocution and vocal music.

According to Rural, the branches actually taught at the first term of the University were selected from the list; and the studies laid down for the present term "embrace trigonometry and surveying, structural botany, *Cicero de Senectute*, French, with Greek for an optional."

It strikes us that a young man thoroughly armed with all this lore should be able to go forth and subdue the prairie and the forest, and compel them to yield their bounties at the word of command. He might appeal in devout Latin to Ceres, for a bountiful crop of corn, wheat, oats, and barley—always remembering to call them maize, triticum hiburnum, avena, and hordeum. He might call on Pomona in mythological devotion, and implore a bounteous crop of pomum Adami (or any other man). And so might he invoke in turn all the gods and goddesses of Latin, Greek, Egyptian, and Congo mythology. Of course they would respond to a learned graduate of the "Farmer's College," and make the untilled soil laugh with a bountiful harvest.

But the dull pupils, who are unable to grasp *all* of the profound and classic lore of the University must still continue to mix a little elbow grease with their imperfect Greek and Latin; and when an obstinate yoke of oxen refuse to be moved by *sic transit gloria mundi* morning, it will still be necessary to hasten their transit with a gad. Or when the plow gets among stumps, and the unappreciative horses refuse to understand *ad quod damnum*, he may still be compelled to swear at them in English. Or if the bugs are eating up his potato crop, and *aut vincere aut mori* fails to arrest them, he must do as others do—wait for victory with their death. If he could only compel the rascals to learn their own name—*cantharides vittata*, they would surely die!

Frightened to Death.

One of our exchanges relates that a gentleman on going home observed in his yard a cat, with head, tail, and hair erect, every nerve trembling with excitement, looking intently at a hen which was sitting in the grass, its head also erect, looking at the cat. The cat approached cautiously and slowly to the hen. When about three feet from the chicken, and about to spring upon it, the gentleman rushed to the rescue and drove away the cat. The hen fell over on her side insensible, was picked up, carried into the house, and died in fifteen minutes.

This is as credible as an incident related to us by a friend, somewhat of a sportsman, the other day. He says that while out hunting a short time ago he "treed" a rabbit in the angle of a stone wall, where the animal was held by the dog at one angle and the sportsman at the other, so that escape was well nigh impossible. The hunter fired, but with a very unsteady aim, and the rabbit rolled over dead. On examination not a mark of injury could be found; and even when skinned and carefully dissected it was found that not a single shot had touched the animal. The poor rabbit had been frightened to death.

JOECKEL'S PATENT REVERSIBLE SEATS.

Seats, or settees with reversible backs, enabling the occupiers to face either way, are very common. They are used in the lecture room, the school room, and even the church; but more noticeably in the railroad car. But none that we have heretofore seen are so constructed as to adjust the seat at the same time with the back. Still, it is apparent, that a seat, to be comfortable, especially when it has a back set at *any* angle, should incline downward and backward from the forward edge. This is not only a measure of comfort, but is demanded by physiological considerations.

Fig. 1.

The seat represented in the accompanying engravings is intended to subserve these purposes. Fig. 1 is a seat calculated for school houses, lecture rooms, and railroad cars. The seat is pivoted on a rod or axis under the seat, connected by a forked rod to an eccentric on the arm of the seat at either end, to which is pivoted, also, the arms supporting the back. As that is lifted and thrown over, the motion of the back compels, by means of the eccentric, a similar motion, although in a less degree, to the seat itself, tilting it slightly back, and holding it and the back in position by the weight of the person occupying the seat, both back and seat being governed in their relative positions by the occupant of the seat. Fig. 2 is another form of the seat, presenting cushioned side pieces for the arms to rest upon in whatever position the back may be. Its connections and action are similar to that intended for the lecture room, the seat being tilted or inclined with the movement of the back. The back is hung on a pivot like a pendu-

Fig. 2.

lum, and any number of seats in a line may be connected with a rod, and the backs reversed simultaneously, the seats being locked with one lock. Not liable to get out of order, simple in construction and operation, and as cheaply made as any other reversible back.

Manufactured by Robert Paton, Manufacturer of School, Church, Lecture Room, and Office Furniture, who may be addressed at 26 Grove street, New York. Patented through the Scientific American Patent Agency, by W. H. Joeckel, December 10, 1861, and September 29, 1868.

Hair-washes.

It is only right to refer to a source of possible disease which is peculiarly wide-spread just now, and against which the public should be cautioned. At the present time there is quite a rage for the use of hair "washes" or "restorers," which, whilst the charge of their being "dyes" is indignantly repudiated, yet in a short time "restore" the color of the hair. The active agent in these washes is, of course, lead. In the majority of cases, probably, a moderate use of such a lotion would be unattended with mischief; but it is worth remembering that palsy has been known to be produced by the long-continued use of cosmetics containing lead. But of the thousands of persons who are now applying lead to their scalps, there will doubtless be some with an extreme susceptibility to the action of the poison, and these will certainly run no inconsiderable risk of finding the "restoration" of their hair attended by loss of power in their wrists.—*Lancet.*

THE SCIENTIFIC AMERICAN.—Once a week as regular as clock work, this invaluable scientific journal appears upon our table. This is the only purely scientific paper published in the country, and is worth, to all lovers of science, many times the subscription price. We hardly peruse a number but what we find something in it worth all that is asked for a year's subscription.—*De Kalb County News.*

[We could fill or columns with similar good notices.]

Scientific American.

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NEW YORK, WEDNESDAY, DECEMBER 9, 1868.

Contents:

(Illustrated articles are marked with an asterisk.)

OUR PLANS FOR 1869.

The SCIENTIFIC AMERICAN will enter upon a new volume on the first of January next, at which time we shall introduce such changes and improvements as will enable us to give a largely increased amount of reading matter and illustrations.

We want and intend to have at least fifty thousand subscribers with the new volume, and there is no reason why we should not have a hundred thousand. We think it no egotism to say that the SCIENTIFIC AMERICAN is a marvel of cheapness in these times of comparatively high prices. The unprinted sheets of paper necessary for a years subscription, could not be purchased at retail for less than $3. We give two volumes of 416 large quarto pages full of valuable reading matter and fine illustrations for $3, or when sent in clubs of ten or more the price is but $2.50 per annum. Mechanics, inventors, manufacturers, chemists, engineers, and all others who take interest in the industrial progress of the world, we appeal to you to assist the circulation of our journal. You will find the volumes for 1869 far more interesting and valuable than any that have preceded it. We cannot at present enter into any particulars but we pledge ourselves to give every subscriber his money's worth.

NATURAL GAS---THE EARTH A GASOMETER.

What the interior of this globe of ours holds, whether it is a solid, a void or vacuum, or a seething mass of molten rocks, a globe of liquid fire, we do not really know. The phenomena of earthquakes, volcanoes, boiling springs, etc.; the increasing heat as the earth is penetrated; the fact that the temperature is greater at the surface of the earth, or the sea level, than above it, and the escape of inflammable gas from artesian wells, seem to point to an internal *inferno* of fire. Centuries ago, these phenomena were noticed, and their existence used as an evidence of a hell, the locality of which was the center of the earth. Still, no one of these, nor all taken together, is absolute proof of an incandescent interior.

We have never yet penetrated the crust of the globe, nor even probed the crater of a volcano and reached the great internal cavity. If the crust is, as has been estimated, about thirty miles thick, the amount of force necessary to raise the tuns of liquid lava to the orifice of a mountain is simply inconceivable, and its effects on the surrounding walls and the surface would be sufficient to materially change the physical characteristics of the country for hundreds of miles around. So, if the earthquake receives its impetus of motion and its almost incalculable power from the agitation of an internal sea of liquid igneous matter, confined within a crust of thirty miles in thickness, and the throes of this sea are transmitted and communicated through this mass to the surface, would the most disastrous earthquake known to history or tradition be sufficient to account for the exercise of such a power? The force that could move, or break, or shake the crust of the globe would be sufficient to turn our continents into bottomless seas and our oceans into mountainous deserts. At most, we have a shaking of the surface, a superficial disturbance of the ocean; but no disappearance of the sea through some cavity reaching the molten center of the globe, and no vomiting forth of a consequent mass of steam, vapor, and lava sufficient to destroy all animal life, and to make the earth a desert. Volcanoes and earthquakes may be accounted for without descending to so great a depth. If the earth's crust is thirty miles thick, there is ample room for the reservoirs of all the power-generating materials necessary for the production of eruptions and earthquakes. That this crust is not solid or homogeneous is not only proved by theories based on analogous truths, but is actually demonstrated by mining, well-boring, and the existence of immense caverns, with plains and hills, and lakes—a subterranean landscape. The increasing heat of the earth below the surface no more demands a vast internal furnace for its existence than does the superior temperature at the earth's surface over the inferior temperature of the cloud line or the mountain tops. Both may be assigned to the same, or a similar cause, that of weight or pressure, or both combined. What other occult or unknown causes, as electricity, magnetism, galvanic agencies, the nature of which we do not understand, it is immaterial now to inquire. Suffice it to say, that we *know* that the earth's crust (to use a familiar term without assenting to the theory of the believers in the igneous philosophy) is not solid, and that it contains explosive and inflammable gases which may be sufficient in quantity and powerful enough in explosive and dangerous quality to produce all the phenomena of volcanic eruptions and earth shakings. The difficulty of accounting for the extended character of these latter phenomena—earthquakes—is no greater than if the theory of an internal globe of liquid fire be accepted, as is evident by the statements made by the supporters of that theory of the thickness of the earth's crust.

That the earth (not merely its interior, but the crust of the globe) is a gas holder, it would be nonsensical to deny. All our coal, whether bituminous or anthracite, contains inflammable gases; coal mines are infested with it and many of the delvers in their depths annually lose their lives by its explosion, either from accidental causes or spontaneous ignition.

No one who is at all acquainted with the business of boring for oil will deny that emissions of inflammable gas are a necessary concomitant to well boring. In the oil regions this gas is frequentntly and extensively used as fuel for driving the engines, or rather for generating steam. A notable instance is one we mentioned twenty-one months ago, in No. 10, Vol. XVI., page 157, SCIENTIFIC AMERICAN. In that article we spoke of a large manufactory in Erie, Pa., the machinery of which was driven and the buildings lighted by the gas from an unproductive oil well. The establishment is that of H. Jarecki & Co., brass workers. For more than two years they have led gas by means of three-inch iron pipe from an unsuccessful oil well 1,200 feet distant from the manufactory, and used it as fuel for their boilers and as lights for their works. The flow is never stopped, never changed in amount of pressure; the gas is of good lighting properties, and when at night or on Sundays the works are stopped, the gas still comes; at night being lighted at the mouth of a pipe of two or two and a half inches diameter situated near the top of the main building. This light is sufficient to illuminate several streets and squares in every direction, and the escaping gas makes a noise as of escaping steam, that may be heard at a long distance, while the gas flame is not less than four or five feet high.

CHEAP ICE HOUSES---A GOOD PLAN.

As the time for securing the harvest of ice is rapidly approaching, a few hints looking iceward may not be amiss. We remember when the ice business was unknown; only some enterprising householders or wealthy men thought of such a luxury as an ice house. Yet as ice has slid out of the category of luxuries and become a comfort, if not a necessity, it is within the power of all living in the country and having access to a pond or a stream to provide themselves and possibly their neighbors with a sufficient supply of this comfort to assist in preserving perishable articles and to temper their beverage of water. In cities and large towns men singly or in companies undertake to provide the dwellers with ice, a crop that costs nothing to plant, tend, or raise, but only to gather and store, but yields handsome returns. But in the country the convenience of daily delivery of the gelid luxury is impossible and inconvenient. To our country readers, therefore some suggestions on the construction of ice houses and the preservation of ice may not be amiss.

A family ice house need not be an expensive structure. It may be built cheaply, subserve its object excellently, and add to the attractions of a homestead by being a sightly object. A building of twelve feet square and eight or nine feet high is sufficient for the wants of the most exacting family. It may be a frame building, entirely above the surface of the ground, and better if supported on posts, elevated a few inches, to be certain of good drainage. Built of joists, two by three inches, with an outer boarding, having inside another series of uprights, also boarded, from six to ten inches removed from the outer shell, with a solid floor of plank, the space between the two walls filled with tan, sawdust, straw, or chaff, and a roof of good pitch, the ice house is complete. A drain for water should be made from the floor, and the space above the uprights, between a loose flooring and the pitch of the roof, filled with straw, hay, or some similar dry, porous material. On the roof should be a ventilator, the top defended from the rain or snow.

The ice should be packed in one solid mass, the sides not reaching the inner walls of the building, but allowing a space of from six to twelve inches all around. The top of the ice should be covered with straw, and the door should be like the sides of the building, or double doors should be made, one in the outer and the other in the inner wall. Plant morning glories or any climbing plant around the building and induce them to creep up the walls and over the roof as an additional defence against the fervid sun of summer.

Two workmen, if not practical carpenters, can put up such a building in one, or at most, two days, which if taste and judgement is used will prove to be a sightly addition to the attractions of a country home, and a useful adjunct to the farm, its contents being convenient and comforting in health and invaluable in sickness. Such an ice house would prove also convenient as a refrigerator or a large scale, preserving food of various kinds and the products of the dairy.

WHAT AN AMERICAN HAS DONE ABROAD.

Mr. F. Watkins, of the London Works, Birmingham, England, arrived in the *Scotia* a few days ago, and will make a tour, before his return, through the Western and Southern States, on business connected with his manufactures. Mr. Watkins was born in the United States, where he resided until 1856, when he went to England to introduce his patent machine for making bolts and nuts. His object in going abroad was to sell his patents, expecting to realize a large sum on them. In this he was disappointed, and after spending some $25,000, and much effort, he abandoned the hope of disposing of his patents, and commenced, on a small scale, the manufacture of bolts and nuts under the title of The Patent Nut and Bolt Company. At the expiration of two years, the demand for his machine-made goods had become so great that Mr. Watkins' time and energies were tested to their full extent in augmenting the number of his machines, and extending his works until they covered some five acres, and the number of hands employed to about five hundred; the product of which was about fifty tuns of bolts and nuts per day. The works of our enterprising American have continued to be enlarged, and now they cover an extent of twenty-four acres in the city of Birmingham, and the hands employed number about twenty-five hundred—producing one hundred tuns per day of these small goods. The capital stock of the London Company, which has so quickly sprung from such a small beginning, under the management of our energetic countryman, is now $2,000,000. Mr. Watkins informs us that his shipment of cotton-bale ties to this country will reach this year the enormous quantity of six or seven thousand tuns.

The prime object of Mr. Watkins' visit at this time is to establish agencies and to receive orders for railroad supplies, of which he is undoubtedly the largest manufacturer in the world.

Mr. Watkins' taste for inventions has not abated since he first took out patents some fifteen years ago; and notwithstanding his immense business cares, when he visits this country, which is about once a year, he brings with him several new inventions on which he obtains patents, making oath to the papers as a citizen of the United States. The career of Mr. Watkins is a remarkable example of Yankee enterprise and success.

A GAS INIMICAL TO ANIMAL LIFE.

Carbonic acid is noxious to animal life although it contains two equivalents of oxygen, the life-giving gas, to one of carbon, also necessary to life. It is generated or disengaged from decomposing vegetable and animal substances, is given off in respiration, and is artificially produced by a mixture of sulphuric acid and carbonate of lime (marble). All effervescent liquids, as fermented liquors, the so-called soda water, and even well and spring water, hold more or less of this gas.

When contained in a liquid used as a beverage it forms a grateful drink to febrile patients, allaying thirst, lessening nausea, and acting as a mild diuretic and anti-emetic. But breathed as a gas it is highly noxious. Owing to its specific gravity, greater than that of the atmosphere, it settles at the bottom of distillery tanks, caves, wells, etc., especially if either of them have contained any animal or vegetable substances.

From these facts in regard to the nature of this gas it is evident that care should be used in exploring caves, cleaning cisterns and vaults, and descending into wells. Life is simply combustion, and where a candle cannot burn a man cannot breathe and live. From this it is evident that to insure safety it is a necessary precaution before descending into a well, cistern, or vault, to lower a light or some article of fuel in a state of combustion. If the flame is extinguished there is no certainty for life. Now, to remove this heavy noxious gas. If a well, containing water, draw out or pump up the water, and, the well, being uncovered, dash the water back by the bucket-full. In its passage down it will absorb sufficient air (oxygen) to neutralize the gas. A better plan, and one applicable to all cases, is to set some quickly-burning substance on fire, as a bundle of straw, or rags saturated with benzine, and drop it into the well. The object is to rarefy the heat sufficiently to raise or lift the heavy noxious gas. If the flame should be extinguished on reaching the stratum of noxious gas, the heat, by repeated trials, will be sufficient to raise the gas and render the well safe.

So many deaths have occurred from descents into vaults, cisterns, and wells, for the purpose of cleaning them, that some attention should be drawn to the danger and the necessary and simple precautions. Some twenty years ago we saw two men killed within a few minutes by descending into a vat in a distillery from which the liquor had been drawn the day before. The second lost his life by his generous attempt to save the first, and not until these two perished did those in charge of the works seem to think that any precaution was necessary. Subsequently the writer, in descending a well to recover a lost bucket came near losing his life, and was saved merely by the accident of deep water and the timely interference of the bystanders at the mouth of the well. Most of these accidents, generally fatal—occur through ignorance, and therefore we draw special attention to the simple precautions we recommend which are neither costly nor troublesome.

REMINISCENCES OF TRAVEL IN SPAIN.

MADRID—THE ROYAL PALACE—SPANISH MANNERS.

We consider it fortunate in some respects to have visited Spain under the old regime—and before revolution had destroyed many of those ancient landmarks which add so much to the interest of the tourist—for it is notorious that revolutions in Europe have always been attended by the destruction of many rare and beautiful objects of architecture and art, which appeared to symbolize and foster oppression and cruelty.

We spent several days in Madrid and vicinity and wrote a letter for the SCIENTIFIC AMERICAN giving our impressions of that city and of its people, but for some reason the letter never reached its destination.

It was a fat looking package, and we have reasons for thinking that the post officials thought best to see what it contained. If they read it—and we think they did—some of the statements were found not very complimentary to the manners and customs of the Madrilenos. We regretted at the time the loss of that letter which had cost us some thought and labor, but had no intention to reproduce it for publication.

We think, however, in view of the interest which centers in Spanish affairs our readers may be willing to read a few stray notes about Madrid and its surroundings, which we propose to give in two or three papers.

Of the many thousands of our countrymen who make annual visits to Europe, few ever visit Spain.

Tourists usually are content to follow the beaten track of travel through France, Italy, Switzerland, and Germany. They imagine, and not without reason, that Spain is a hard country to travel in—that a trip down among the Spaniards suggests brigandage, treachery, and stilettos, discomfort and hard fare.

The hotels of the larger cities are tolerably good, it is true, but those found in out-of-the-way places are usually wretched abodes, scarcely fit for mules and donkeys, with which agreeable beasts the country is well supplied.

The floors of the houses are usually brick, fuel is scarce, and no comforts are provided against the sharp chill of a winter's night. An English gentleman, who was compelled to stop at a railway junction, informed us that he slept at one of those cheerless *posadas* upon a very tough bed, in a room having a stone floor, without any glass in the windows, and nearly starved at that, which confirms our experience. In regard to the important matter of food, it is not worth while to say much about it—oil and garlic are the staples—and to one not accustomed to these articles, fasting and prayer are excellent substitutes. Yet, in spite of all drawbacks, Spain, in some respects, is the more interesting country.

The scenery, especially in the Northern provinces and sierras, is grand and picturesque in the extreme—often desolate and peculiarly savage.

The inhabitants are also interesting in their rude manners, customs, and superstitions; whilst in the Southern provinces the cities are quaint, and the country, oriental in its character, furnishing an abundant supply of luscious tropical fruits and wines—the latter being usually kept in hog-skins which impart to it a peculiar flavor. There are also many Roman ruins (Spain was once the granary of the Roman Empire); exquisite Moorish structures; grand palaces; extensive monastic buildings, which are now being torn down; and sublime Gothic cathedrals unequaled in Europe, rich in saintly relics, precious stones, gold and silver ornaments, sacerdotal vestments and pictures—indeed the fine arts and literature flourished in the 17th century, when Spain was the proudest kingdom in Europe—but of this we may say more at another time.

It is not easy to conjecture how it happened that Madrid became the capital of Spain, but it is supposed that Charles the Fifth fixed upon it by reason of its central commanding position where he could best overlook and govern his subjects. The city stands upon a series of hills, 2,300 feet above the sea, and within sight of the snowy Guadarama mountains lying on the North. The surrounding country is entirely swept of timber so that by reason of its exposed situation the north winds sweep through it unopposed, and persons have frozen to death in winter.

In summer it is like an oven—the thermometor frequently standing at 105°. These extremes of heat and cold make it an undesirable, and at times, a dangerous place of residence. Yet, in spite of these objections, Madrid is a fine city, numbering upwards of 400,000 inhabitants, abounding in fine public buildings, broad, well-kept, well-built streets, promenades, parks, and drives. It is a modern looking city, and compared to Toledo, Grenada, Cordova, Saragossa, Seville, and Valencia, has little about it of a Spanish character—nothing to remind one of the chivalrous fighting times of Charles the Fifth and Philip the Second; and but for a few lazy Spanish gentlemen, who prefer the cloak to the paletot coat, and the hordes of miserable beggars, one might easily imagine himself in a thriving French city, so thoroughly has Paris fashion possessed itself of the costumes and equipages of the people. The ladies, however, seem to reject the hat, and usually appear on the streets with a graceful lace mantilla thrown over their heads.

In the 10th century Madrid was an outpost of the conquering Arab, and these enterprising Moors built an Alcazar for the Kalif which was destroyed by an earthquake, and the palace built upon its site by Henry the Fourth, with all its marvelous treasures of art, gold, silver, and diamond ornaments were consumed by fire. The present comparatively new palace, constructed of white colmenar stone, and completed in 1764, is undoubtedly one of the finest palatial edifices in Europe. It forms a square of nearly 500 feet, with numerous open courts, gardens, and other appendages of a royal residence, and cost upwards of four million dollars. For some reason the Queen refused to allow strangers to visit the palace, owing, it is said, to the fact that at one time an English party abused the royal hospitality by either helping themselves to some small articles, or mutilating the curtains. The palace contains among other treasures a great variety of clocks, for which Ferdinand the Seventh and his father had a great passion, though it is said of them that they never knew the right time. Charles the Fifth was also afflicted with the same horological mania, and not succeeding in making any two of his clocks go alike, he wisely concluded that they were like men's heads, always a little out of gear.

The chief open air resort of Madrilenos is the Puerta del Sol (Gate of the Sun), a considerable circular plaza, having a fine fountain in its center. This spot seem to be a central one for everybody in the city, and Spaniards, enveloped within the ample folds of their cloaks, plant themselves upon the sidewalks, where they lazily smoke and talk away valuable time, which wiser men know to improve, and appear not to consider themselves in the way of any one. The Spaniard smokes in the street; he smokes at the table, no matter who dislikes it; he smokes in the omnibus; he smokes in the cars; he smokes to the church door, and lights up as soon as he gets out; and, for aught we know, he smokes in his bed, and seems not to entertain the slightest notion that the fumes are not delicious under all circumstances; and this excessive smoking, no doubt, accounts for the cadaverous appearance of a majority of the Spanish men.

WASHINGTON CORRESPONDENCE.

FEES IN PATENT OFFICE CASES—IMPROVEMENTS GOING ON—EXAMINATION OF EXAMINERS.

Heretofore the Judges of the Supreme Court of this District have been paid a fee of $25 in each and every case of appeal from the Commissioner of Patents. Hon. Elisha Foote has come to the conclusion that such payments are illegal, and has discontinued the same, so that now and until some legislation is had in the matter by Congress, no fee will be required for an appeal to the Judges of the Supreme Court. The Commissioner takes the ground, that inasmuch as the Act of March 2, 1861, which repeals all former acts fixing the rates of the Patent Office fees, makes no mention of a fee for an appeal to the judges, none is required. If the Commissioner is right in his view of the matter, then the Patent Office has been exacting, and the judges receiving, $25 for each and every appeal that has come before them for the past seven years, without any authority of law for doing so. The judges, however, we understand, entertain a different opinion in regard to the matter. They contend that the fee paid for an appeal to them, is not a Patent Office fee, but belongs to the judge who hears the appeal; and that consequently, the Act of March 3, 1839, requiring the payment of this fee, was not affected by the Act of March 2, 1861.

Improvements in the Patent Office Building.—The sand stone tiles which have covered the first and second floors of the corridors of the old building fronting on F street, have been removed, and in their place new tiles of marble from the quarry at Lee, Mass., are now being put down, giving a greatly improved appearance to the corridors in this part of the building. In the draftmen's room the old portfolios in which the drawings have been kept since the Patent Office building was first occupied have been thrown aside, and the rooms fitted up with drawers which are hung on slides and trunnions, so that when pulled out to their extent they can be tilted into a conveniently inclined position, to admit of the ready handling and inspection of the drawings. The drawer is covered by a patent, and we understand that the eight hundred and upward which have already been put in, cost upward of twenty thousand dollars. The Agricultural Department, as you are probably aware, has moved out of the Patent Office into a building built expressly for it; and the rooms made vacant by this removal have been fitted up for, and are now occupied by the Examiners in charge of Land Conveyances, Navigation, Fire-arms, Builders' Hardware, and Chemistry.

The Board appointed by Commissioner Foote to ascertain the qualifications of Examiners and their assistants are holding daily sessions of about three hours each in what some one has facetiously named a "sweat box;" and they dispose of about two cases a day. The following are some of the questions which were been asked the candidates, viz.: "What's a parallax?" "What's a magnet?" "What's a chemical equivalent?" "What's the difference between plaster of Paris and lime?" etc., etc. Prof. Henry H. Bates, of Hobart College, N.Y., has lately been appointed a second assistant Examiner, and assigned to duty with General Spear in the class of Civil Engineering. Prof. Bates held the adjunct chair of Mathematics in Hobart College, and he passed an unusually creditable examination before the Board of Examiners.

COMMUNE BONUM.

EXHIBITION EXCHANGE FOR PATENTEES.

There has been felt for a long time among inventors and patentees a necessity for some headquarters in this city where they could exhibit their inventions and negotiate sales of their patents and patented wares. Heretofore the offices and bar-rooms of some of our hotels have been the resort of this class of persons, and many have realized handsome sums from sales in these saloons; but they are not desirable places for such traffic.

We hail with pleasure the inauguration of a new incorporated company who propose to fill a long desired want in this city, by establishing an exchange in a building on Broadway for exhibiting new inventions, and where patentees can have facilities for consummating sales.

An advertisement of the new project giving fuller particulars may be found on another page.

MELBOURNE, Australia, completed its thirty-third year of existence on the 29th of August last. A wilderness in 1835 it is in 1868 a fine flourishing colony.

THE SOCIAL SCIENCE CONGRESS IN ENGLAND.

Surely there is quite enough of sorrow and suffering in this sinful world to justify any well meant, even though ill devised or misdirected efforts for the eradication of social evils. So important a movement as the recent Social Science Congress, held at Birmingham, England, gave us hopes that in the deliberations of the many learned and thinking men sure to be present at such a meeting, something practical and definite might be evolved that would contrast refreshingly with the vague and unsatisfactory proceedings hitherto characteristic of similar movements. We are however compelled to say that a careful review of the transactions of this congress has resulted in the disappointment of our hopes.

Why is the mockery of applying the name of science to a conglomeration of crude speculative opinions, unsystematized, and without the solid basis of fact persisted in. There was no such thing as social science, in the strict interpretation of the term, apparent in the deliberations of the Congress at Birmingham. Not the slightest reference, so far as we can see, to the natural laws which *govern* the formation of all society, or even the slightest attempt to show that those laws are violated in its present organization, and if so, how and why.

In the place of such a method, which, if there be a *science* of sociology is certainly possible, and as the true scientific method, the one of all others to be closely followed we should think in in dealing with such a subject, we have discussions upon jurisprudence, free trade, international law, neutrality of the English Government during the late rebellion in the United States, change of nationality, etc., etc.

To sum up the whole matter, the efforts of the Social Science Congress seem to have been principally directed to the display of a class of talent which society could very well dispense with and discussion of topics as foreign as possible to the subject in hand.

The notoriety which is sought by a certain class of aspirants can be gained often by persistent braying, and in our perusal of reports that have reached us in reference to the Birmingham convention, we have been painfully impressed with the belief that those who took part in its proceedings, had the good of society less at heart than the successful display of their own rhetoric. Be this as it may, we are more than ever impressed with the belief that such meetings will never result in any permanent, or even temporary, alleviation of the current evils of modern society.

Wood Gas.

Some years since we noticed at length the manufacture of illuminating gas from wood. Some of the processes which were economical before the war were found impracticable for a while. Latterly the subject appears to have acquired renewed interest.

A correspondent writes us that the cities of Wilmington, N. C., Macon and Columbus, Ga., and Montgomery, Ala., are all lighted with wood gas. Another correspondent gives the following facts about the products of the distillation of wood:

"The article in your journal of 18th Nov., 1868, on the subject of wood gas directs attention to an important and thoroughly practicable source of cheap and good gas for illuminating purposes. All varieties of wood, when subjected to distillation in close retorts, yield gaseous and liquid products, and leave a residue of charcoal in the retort. The respective quantities of these products and their quality depend chiefly on the kind of wood used, on the degree of heat to which it is subjected, and the mode in which the heat is applied.

"High temperatures produce a larger proportion of gas than low, but the yield of the liquid products is thereby diminished. These liquid products contain several substances of considerable commercial value, the most important being acetic acid, tar, and wood spirit or naphtha. When properly purified and diluted with water the acetic acid yields a perfectly transparent white vinegar, which cannot be distinguished from the best French white wine vinegar, or the best English malt vinegar, and infinitely superior to any cider vinegar. The tar is of equal quality to North Carolina tar and may be used for the same purposes. The naphtha or wood spirit is an excellent and cheap substitute for alcohol; for such purposes as burning in lamps, manufacturing varnishes, for dissolving gums and the aniline colors, and for the manufacture of chloroform. Its value for these purposes is well known in Europe, and it is there extensively used. The charcoal may be used for all the purposes to which that substance is usually applied The gas is easily purified, and may, by suitable means, be obtained of high illuminating power. Its perfect freedom from sulphur is an important advantage it possesses over coal gas.

"Hard woods such as oak, beech, and birch, are the most suitable. Good oak treated at a moderate temperature yields as follows from one cord. The money values attached are very low, very much below their real or selling prices:

5,000 feet illuminating gas at $2 per 1,000 feet..	$10 00.
50 bushels charcoal at 10 cents..................	5 00.
2 barrels tar at $1..............................	2 00.
5 gallons naphtha at $1..........................	5 00.
100 gallons vinegar at 25 cents..................	25 00.
1 cord of oak yields.............................	$47 00.

"By a higher temperature more gas may be obtained with a corresponding reduction in the yield of liquid products. The manufacturing expenses are moderate and the necessary apparatus not very costly. In many parts of the country where wood is cheap and coal dear this manufacture could be advantageously substituted for that of coal gas."

THE TELESCOPE.—Professor Alexander, of New Jersey College, Princeton, delivers the second lecture of the American Institute course on Friday evening, December 4, at Steinway Hall. Subject—The Telescope and its Revelations.

Editorial Summary.

The Art of Perfumery.—We have received a communication from Septimus Piesse, F.C.S., the well known perfumer of London, and a frequent contributor to the Scientific American, in which he states that he sent to the publisher at Philadelphia for a copy of the book "Guide for the Perfumer," noticed in the Scientific American Oct. 7th, and was much chagrined to find that it was almost an entire reprint of his own work, "The Art of Perfumery," and without a single reference either to his name or the source from whence the matter had been taken. Mr. Piesse further states that his work has gone through several editions, and that while people are welcome to the use of his recipes, he considers it unjust to appropriate his labor of twenty years without the honorable mention of his name.

The Suez Canal.—There were in all 96,864,554 cubic yards of excavation to be removed on the line of the Suez Canal. Two-thirds, or 64,447,545 cubic yards had been removed on the 15th of September last, and the work of removal was going on at the rate of two and a half million yards a month. The two great piers at Port Said, on the Mediterranean, will, when finished, contain 326,750 cubic yards of blocks, of which less than 20,000 remain to be sunk. The canal is to be officially opened by the imperial schooner *Laurette*, which left Toulon for the Red Sea.

The Meteors.—Our space will not permit us to publish a large number of communications upon the above subject, of which we are in receipt. They contain few additional facts of interest, and as we are much pressed for space we are sure our esteemed correspondents will excuse us.

What is Sold as Honey in Germany.—A substance of a rather fine flavor and beautiful appearance is finding a ready sale as honey just now in Germany. This substitute for the genuine product of the bee-hive is simply starch converted into sugar by means of sulphuric acid.

A turning tool used on wood can have its temper destroyed by heating in working as well as one used in turning iron. In either case, the edge of the chisel should be exposed to the air, and not wholly buried in the substance.

The conference of the European powers at St. Petersburgh have decided that no explosive missile shall be employed in war, which weighs less than 400 grammes.

Heat and friction make an almost impenetrable scale on the surface of iron. Judicious annealing will remove it.

NEW PUBLICATIONS.

The Workshop; a Monthly devoted to Progress in the Useful Arts. E. Steiger, 17 North William street, New York.

Number 10 of the first volume of this excellent monthly is received. It is the American edition of *Die Gewerbehalle*, a German periodical published simultaneously in German, French, and English. Beside historical notices of the progress of the arts, and articles cognate to this comprehensive subject, it contains beautiful engravings of articles of household use, interior and exterior architectural decorations, carvings, sculptures, bas-reliefs, etc. The letter press is bold and plain and the engravings elegant. Price 50 cents a number or $5.40 a year in advance.

Inventions Patented in England by Americans.

[Compiled from the "Journal of the Commissioners of Patents."]

PROVISIONAL PROTECTION FOR SIX MONTHS.

Spinning Cotton and other Fibrous Substances.—John Whitin, Whitinsville, Mass. Oct. 7, 1868.

3,070.—Watches, Clocks, and other Time Pieces.—Henry Josephi, New York city. Oct. 8, 1868.

3,091.—Binnacle for Iron Ships.—Charles Ole Olsen, New York city. Oct. 8, 1868.

3,151.—Apparatus for Generating and Burning the Vapor of Hydrocarbon Liquids.—David Lowe, Boston, Mass. Oct. 14 1868.

3,155.—Elastic Mold.—Thomas Taylor, Edmund P. Rogers, and Miers Coryell New York city. Oct. 15, 1868.

3,165.—Breech-loading Fire-arm.—Valentine Fogerty, Boston, Mass. Oct. 15, 1868.

3,196.—Carriages for Ordnance.—Geo. R. Wilson, Washington, D. C. Oct. 19, 1868.

3,131.—Revolving and Repeating Fire-arms.—F. A. Le Mat, New Orleans, La. Oct. 13, 1868.

3,171.—Manufacture of Sirup and Sugar.—N. Pigeon, Brooklyn, N. Y. Oct. 16, 1828.

3,189.—Scissors.—Sarah H. Brisbane, Fordham, N. Y. Oct. 19, 1868.

3,227.—Carriage Wheel.—Walter K. Foster, Mass. Oct. 21, 1868.

3,233.—Machinery for Propelling Water Craft.—Edwin S. Renwick, New York city. Oct. 22, 1868.

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. C. R., of ——The glass used in an aquarium can be advantageously cemented to the frame by good putty made of white lead and linseed oil. Before putting in the fish, etc., water should be allowed to stand in it, and be changed until no taste or smell is imparted to it.

C. H. D., of N. Y.—The phrase, "The cup that cheers and not inebriates," is perfectly grammatical. The placing of the negative adverb before the verb, inebriates, without the auxiliary *does*, is not perhaps in exact accordance with our English idiom but does not by any means exceed the license accorded to poetical writers.

W. C. W., of Mich.—Registers for admitting hot air should always be placed at the bottom of the room intended to be heated by them—Ventilating registers should be placed near the ceiling.

C. G. C., of Pa.—The later Polar Expeditions have attempted to follow the Gulf Stream, in the hopes of thereby attaining a higher latitude than would otherwise be possible, but they have not reached the open Polar sea.

A. L. of Mass.—The curative or medicinal properties in petroleum (sold under various names) is owing to its carbonaceous properties. It is a hydro-carbon. The carbon contained in cod liver oil constitutes also its medicinal value.

OFFICIAL REPORT OF

PATENTS AND CLAIMS

Issued by the United States Patent Office,

FOR THE WEEK ENDING NOVEMBER 24, 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.*

84,247.—Planting Machine.—Samuel L. Allen, Cinnaminson, N. J.

I claim, 1st, In combination with the carrying wheel, A, a central hopper, B, having chambers, C, constructed and arranged around in the said hopper substantially as and for the purpose described.

2d, In combination with the said hopper and chambers, arranged and combined as described, the slides, c', constructed and operating substantially as and for the purpose described.

3d, In combination with the hopper, B, and the perforated rim or tread, a', of the wheel, A, the continuous intervening channel, a6, as and for the purpose described.

84,248.—Swaging Attachment for Sheet Metal Working Machines.—Henry E. Anderson, Ripon, Wis.

I claim, 1st, The screw, F, nut, G, swaging rollers, H and I, acting in combination, substantially as described.

2d, Frame, C, guide standard, D, guide, E, nut, L, and index hand, P, substantially as and for the purpose described.

84,249.—Steam Engine.—Earle C. Bacon, New York city.

I claim the construction of the oblong hollow trunk, D, and its arrangement, with reference to the piston head, B, cylinder, A, and cylinder head, F, substantially as described.

84,250.—Manufacture of Carbonate of Soda.—Haydn M. Baker, New York city.

I claim the use of bicarbonate of soda for the purpose of decomposing soluble silicate of soda, to produce pure carbonate of soda and silica (silicic acid).

84,251.—Steam Pump.—John S. Barden, Providence, R. I., assignor to himself and Daniel N. Pickering, Boston, Mass.

I claim the combination of the stationary cylinder, K, and its passages, b2 c2, with the pump pistons, 1' k', connected with the shaft, B, and arranged in the pump case, provided with valves and partitions, and induction and eduction conduits, as explained.

Also the arrangement of the steam engine and the pump, and their connection by the neck, I, and the shaft, B, as described.

84,252.—Plow.—Edward D. Benjamin, Old Town, Ill.

I claim, 1st, The combination of the whiffletrees with the plow, when the same are constructed and arranged in connection therewith, in the manner herein shown and described.

2d, The levers, D D', pivoted to the ends of the axletree, and bearing wheel axles, E E, at the ends of their short arms, and having their long arms connected by the adjustable sway bar, G, the whole arranged and operating substantially as herein set forth and specified.

3d, The folding frame, K, arranged and operating as described and for the purpose specified.

84,253.—Let-off Mechanism for Looms.—Thomas Booth and Chas. C. Sanderson, Norway, Me.

We claim the combination of standard, d, arms g g, rods, i i, weights, j j, arms, k k, and bands, n n, with the beam, b, as and for the purposes herein set forth.

84,254.—Horse Rake.—L. S. Bortree, Grand Rapids, Mich.

I claim, 1st, The vibrating frame, E, bell crank lever, F, arms, G, slotted double pronged teeth, I, provided with rollers, K, and the spiral springs, J, when constructed, arranged, and operating substantially as herein described and for the purposes specified.

2d, The standards, L, rock shaft, N, provided with arms, X, the wires, P, foot lever, O, and bell crank lever, F, substantially as and for the purposes set forth.

84,255.—Bandage for Preternatural Enlargements.—Anson R. Brown, M. D., Albion, Mich.

I claim an elastic bandage having numerous perforations or interstices, e, in its structure, to admit air to the surface of a diseased portion of the human body while under compression, substantially as and for the purpose herein set forth.

84,256.—Hinge Machine.—Edward Brown, New York city.

I claim the combination with the bed, A, posts B, shaft, D, and gate, F, with their connections, constituting the frame and moving parts of a press, of the die, H, the yielding dies, K I, the levers, T T1 T2 T3 and N, and their corresponding springs, substantially as and for the purpose set forth.

84,257.—Hay Spreader.—Geo. E. Burt and Edwin A. Hildreth, Harvard, Mass.

We claim, 1st, The forks, j j, when so arranged as to revolve horizontally over the ground, turning the hay, substantially as described and for the purpose set forth.

2d, The forks, j j, when so arranged as to revolve horizontally over the ground and sweep the hay from before the wheels, in order to give them a path clear from the grass or hay, substantially as described and set forth.

3d, The arms, g and h, in combination with the fork handle i, when so arranged as to revolve the forks, j j, horizontally over the surface of the ground, gathering and discharging or turning the hay, substantially as described and set forth.

4th, The forks, j j, when actuated by mechanism, so constructed that there shall be imparted to the forks, in addition to their horizontal rotary motion, a dipping and rising motion, to collect and discharge the hay, substantially as described.

5th, The forks, j j, when hung from hinges, l and m (one or both), and so arranged that the forks can freely rise, and pass over rising ground or obstacles, substantially as described and for the purpose set forth.

6th, The shaft, f, disk, u, and eccentric wrist, s, in combination with the driving arm, g, and operating arm, h, arranged to operate the forks, j j, substantially as described.

7th, The gear, c, pinion, d, tube, e, shaft, f, disk, u, and wrist, s, when used in combination, to operate the arms and forks of a hay tedder or rake, substantially as described.

8th, The flexible joints, l and m, in the arms, g and h, to allow the forks to follow over rising ground or obstacles, substantially as described and for the purpose set forth.

9th, The combination of the forks, j j, the pivots, q, pins, p, staves, t, and pivots, k and n, with the driving arm, g, and operating arm, h, operating as and for the purposes set forth.

10th, The springs, v v, when so arranged as to lift a portion of the weight of the of the forks, j j, and their connections, substantially as described and for the purpose set forth.

84,258.—Car Spring.—E. T. Bussell, Indianapolis, Ind.

I claim, 1st, The formation of a rubber spiral and air spring, by the arrangement and combination of two or more concentric hollow tubes of vulcanized india-rubber, R1 R2 R3, and four or more spiral springs, S1 S2 S3 S4, in such manner that the spirals support the rubber tubes externally as well as internally, and so as to form annular air spaces, for the confinement of atmospheric air between said rubber tubes, substantially as described and shown.

2d, The chambered base, C2, with the induction openings, I, furnished with valves, V, and eduction openings, J, between and in combination with the tubular and spiral spring, composed of the rubber tubes, R, and spirals, S, arranged to operate in conjunction, as shown and described.

84,259.—Method of Generating Fixed Gases from Hydrocarbon Vapors.—John Butler, Brooklyn, N. Y.

I claim, 1st, An arrangement of mechanism for roasting hydrocarbon vapors, or changing them into permanent gases, by exposing them to heat while minutely divided, or separated into small streams, substantially as herein shown and described.

2d, The combination and arrangement of the furnace or fire chamber, A, boiler, B, vaporizer, E, roasting chamber, H, and perforated charcoal block, I, or its equivalent, with each other, substantially as herein shown and described and for the purpose set forth.

3d, The perforated charcoal block, I, prepared and operating substantially as herein shown and described in combination with the roasting chamber, H, as and for the purpose set forth.

84,260.—Step Ladder.—Joseph Charleville, St. Louis Co., Mo.

I claim the rail, a, its tenon, f, in combination with the mortise, g, of the seat board, B, and the brace, G, and step or round, b, substantially as and for the purposes set forth.

84,261.—Spinning Wheel.—Chas. L. Cole (assignor to himself and Thomas Johnson), Richmond, Mich.

I claim the rock shaft, M, wheel, L, friction wheels, H S and T, arms, Q and R, belts, N U and V, and treadles, O and P, when arranged relatively to each other, as herein described, in connection with any hand spinning wheel, and operating as and for the purposes substantially as set forth.

84,262.—Water Closet.—H. H. Craigie, New York city.

I claim, 1st, The piston, l, moving in the cylinder, b, between the inlet and outlet pipes, in combination with the valve, u, and seat, f, the parts being arranged and operating substantially as and for the purposes set forth.

2d, The rod, m, piston, s, and valve controlling chamber, a, in combination with the water way, S, and valve, n, to the water closet, substantially as specified, so that the end movement given to the piston rod shall open or close the water way, S, for the purposes specified.

3d, The valve, r, applied at the piston rod, m, in combination with the valve controlling chamber, a, and a piston moving in said chamber, to regulate the closing of a water closet valve, substantially as set forth.

84,263.—Manufacture of Paper Belting.—Jas. B. Crane, Dalton, Mass.

I claim the process herein described for manufacturing paper fabric, substantially in the manner and for the purposes herein set forth and described.

84,264.—Divided Axle for Railways.—Daniel M. Cummings, Wyman Pattee, and Albert M. Shaw, Enfield, N. H.

We claim uniting the axle section, b, with the coupling section, d, by fitting a tapering portion of the former into the tapering bore of the latter, and then employing a screw nut or nuts on the inwardly projecting end of said axle section, when the said coupling section, d, is combined with its matching coupling section, c, substantially in the manner herein set forth.

Also, the arrangement of a properly proportioned disk or washer, e, within the coupling box of our improved car axle, in such a position as to prevent any lateral action that may be exerted upon the car wheels or axle from injuriously jamming the tapering portion of the axle section, b, within the coupling section, d, substantially as herein set forth.

84,265.—Thill Coupling.—Wm H Curtiss, Panesville, Ohio.

I claim the combination of the hook, B, and its key, B', with the rigid joint bolt, E, and its notch, e', when arranged and operating in the manner and for the purpose set forth.

84,266.—Device for Hanging Picture and other Frames.—Chas. B. Davies, Dayton, Ohio.

I claim the method of hanging frames herein described, with the eyes, B C and C', ring, D, cord, F, and slip, F, when arranged with relation to the frame, A, substantially as an for the purposes set forth.

84,267.—Clog.—Job A. Davis, Watertown, N. Y.

I claim a clog formed in two separate parts, so connected that while drawn toward each other by force of a spring or springs, they may be stretched further apart from each other, substantially as and for the purpose described.

Also, a heel piece for a clog, mounted with a heel support and with a flexible shank, substantially as and for the purpose described.

Also the sole piece, having therein a cavity and a yielding spring or springs, substantially as and for the purpose described.

The combination of the cavity and spring or springs in the sole of the clog, with the elastic shank piece secured to the heel piece, substantially as shown and described.

84,268.—Hod Elevator.—Paul Dehlinger, Buffalo, N. Y.

I claim, 1st, A frame, provided with angular notches, when used in combination with hods, provided with cleats, j for elevating the latter, substantially as set forth.

2d, The arrangement of the guard board, M, between the hod racks, as described.

3d, In an elevating apparatus, the combination and arrangement of the platform, C, with hod racks, E, substantially as set forth.

4th, The arrangement therewith of a hinged step, Q, as herein set forth.

5th, The construction of the hod rack, E, with double row of angular notches, e e', in the manner described.

6th, The arrangement of the brace and elevating bars, g g g g, and eye, h, with the hod racks, M, constructed as herein set forth.

84,269.—Horse Hay Fork.—Wm. E. Derrick, Jordan, N. Y.

I claim the caliper shaped prongs, B, in combination with the straight piercing shaft, C, for the purpose herein described.

84,270.—Reflector for Public Halls, etc.—Ossian E. Dodge, St. Paul, Minn.

I claim the double reflector, E, as arranged and operated by the cord, H, in combination with the pipe, A, and burners, for the purposes specified.

84,271.—Horse Hay Fork.—Geo. H. Dow, Feeport, Ill.

I claim the curvilinear tine, A, in combination with the prong, B, in the manner as and for the purpose set forth.

84,272.—Composition for Pavements.—Gustave Dubelle, Boston, Mass.

I claim the new pavement composition as made of the several materials and in the manner as herein first described.

84,273.—Type Setting Machine.—F. G. Foster, Eagle Rock, N. C.

I claim, 1st, The arrangement of the removable vertical plate, I, when provided with recesses, x x, and groves, x' x', as described, and entirely covered with a glass or other transparent plate, with the type boxes, D D, and fingers, f f, acting in the recesses, x x, substantially as and for the purposes herein set forth.

2d, The type box, D, constructed as described, and provided with a spring g, to press the type forward, substantially as herein set forth.

3d, The arrangement of the fingers, f f, placed in the recesses on the plate, in combination with the journal, c, lever, d, rod, b, and the key, C, all constructed as described, and the fingers operating so as to force the type down in the grooves, substantially as herein set forth.

4th, The guide, E, constructed as described, with a curved groove to guide the type properly into the composing stick, as herein set forth.

5th, The combination of the setting rule, G, composing stick, h, slide, i, and galley, F, all constructed as described, and operating as and for the purposes herein set forth.

6th, The setting rule, G, constructed and working in the manner and for the purposes herein set forth.

84,274.—Pump.—Earl J. Hall (assignor to himself and Jacob Eldridge), Indianapolis, Ind.

I claim the arrangement and combination of water box, A, horizontal induction pipes, V, valve chambers, B, and the means used for operating the same, all as shown.

84,275.—Centre Board Wench.—Everett C. Hammond, (assignor to himself, O. H. Pennock, and Ira G. W. Pennock), Oswego, N. Y.

I claim, 1st, The barrel, A, worm wheel, B, endless screw, C, and gears, E, f, combined and operated substantially as herein described, and for the purpose set forth.

2d, The arrangement of the operating shaft or shafts, c e, when placed at right angles to the barrel, A, for the purpose herein described.

84,276.—Fan.—Anne B. Hancock, Suspension Bridge, N. Y.

I claim the combination of the whalebone frame, A, E, and buckram plates, C, to form an elastic foundation to receive the covering of feathers, D, substantially as described.

84,277.—Evaporator.—James Harris, Janesville, Wis.

I claim, 1st, So constructing the opening in the partition between finishing apartment, b''', and the others, that the bottom of this opening, being above the bottom of these latter, they cannot get empty and burn.

2d, Dropping the finishing apartment, b''', lower than the others.

3d, The combination and arrangement of dampers, e and f, with the pan, C, constructed with its several apartments, as set forth.

4th, The combination of pan, C, damper f, cold air passage, g', and flue, d.

5th, The evaporator, constructed, arranged, and operated in the manner substantially as shown and described, and for the purpose set forth.

84,278.—Balance Slide Valve.—Thomas M. Herriott and Samuel M. Meyers, South Pittsburg, Pa.

We claim the combination of the rings, C and B, with the projection, S, the whole constructed substantially as shown and described.

84,279.—Molding Machinery.—William T. Horrobin, Bennington, Vt.

I claim, 1st, The combination, substantially as described, of the reversible follow board with the sliding carriage, C, for the purposes set forth.

2d, The combination of the flask with the reversible follow board and the champing screws, J, as and for the purpose set forth.

84,280.—Rotary Steam Engine.—Charles Kaiser, New York city.

I claim, 1st, The arrangement of the circular piston, H, in an oblong or oval cylinder, A, when said piston is provided with fly valves, N, N', N'', N''', constructed and fitted into the circumference of the piston, substantially as described.

2d, The construction and arrangement of the fly valves, N, N', N'', N''', in the circumference of the piston, H, with circular packing pieces, c, near the outer ends of said valves, substantially as herein set forth.

3d, In combination with a circular piston, H, provided with fly valves, constructed as above described, and working in an oval cylinder, the arrangement of two induction passages, n, n, and of two eduction passages, m, m, directly opposite each other, whereby to admit and exhaust the steam simultaneously at the opposite sides of the revolving piston, substantially as described.

4th, Rods or levers, s, s', s'', s''' forming a parallelogram, in combination with the fly valves, said levers being provided with springs, substantially as set forth.

84,281.—Cloth Measuring Apparatus.—R. H. Kent, Middlebury, Ohio.

I claim the combination of the slide, O, and adjustable standard, R, as arranged in relation to and combined to co-operate with the rollers, d, J, winding shaft, F, all in the manner as and for the purpose set forth.

84,282.—Water Elevator.—Chester King, East Cleveland, Ohio.

I claim the guide arms, F, hinged at a, and tilting arms, H, when arranged in relation to the curb, A, and spout, I, all constructed in the manner and for the purposes substantially as described.

84,283.—Portable Gas Apparatus.—George H. Kitchen, New York, and Scotto C. Nash, Brooklyn, N. Y.

We claim, 1st, A diaphragm, h, introduced in the lower part of the vessel containing the liquid hydrocarbon, so that said liquid shall freely pass into and fill the space below said diaphragm, in combination with a pipe supplying air below said diaphragm, and a pipe conveying away said carbureted air, substantially as set forth, whereby said diaphragm directs the bubbles of air, as they pass through the lower part only of the liquid hydrocarbon, and they do not disturb or vaporize the upper portion of the same, as set forth.

2d, The diaphragm, h, and spiral flange, forming a channel in which the bubbles of air travel, in combination with the pipes, 2 and k, and diaphragm, f, within the gasoline vessel, I, substantially as and for the purposes set forth.

3d, A gas holder, provided with perforated distributing pipes in the lower part, in combination with the carbureting vessel, pump, and pipes, arranged substantially as specified, so that the air that is forced directly into the gas holder, to dilute the gaseous hydrocarbon, will enter by the same distributing pipes that have supplied the carbureted air, in order that the contents of the gas holder may be mixed together with uniformity, substantially as set forth.

4th, The combination of a gas holder, formed of a flexible bag, with a pump and carbureting vessel, substantially as and for the purposes specified.

84,284.—Brick Machine.—J. Klinkhardt and W. Kiburz, (assignors to themselves and Paul Oehler), St. Louis, Mo.

We claim the arrangement and combination of the pug mill, A, its screw, b, and passage, a', with the mold chamber, C, and plungers, D and E, and slides, F, substantially as set forth.

Also, the knife, f, when combined and operated with the slide, F, substantially as and for the purpose set forth.

84,285.—Lifting Jack.—Francis Krick, Fidelity, Ohio, assignor to himself and Eli Sinks.

I claim the combination and arrangement of the bars, A B, the lever, C, stirrup, K, guides, E D, and spring catch, G, constructed substantially as and for the purpose specified.

84,286.—Bee Hive.—J. C. Lander and R. R. Lander, Mazo Manie, Wis.

We claim the sections, A, B, movable sides, H, dividing boards, C', and frames, C, when said frames are so arranged in the cases that a space is left between them and the walls, all constructed, combined, and arranged, in relation to each other, in the manner as and for the purpose set forth.

84,287.—COTTON GIN.—Charles Leavitt and W. H. Burridge, Cleveland, Ohio.
We claim, 1st, The rollers, D, and G, vibrating comb, J, and plate, K, combined and operating as set forth.
2d, In combination with the above, the rotating brush, I, or its equivalent, operating substantially as described.

84,288.—BRIDGE.—J. H. Linville, Philadelphia, Pa.
I claim the construction and arrangement of tension bars and struts for giving initial tensile stress to the bars and rigidity to the struts, substantially as herein set forth.

84,289.—MODE OF PACKING LAMP SHADES.—Edward A. Locke and William N. Weeden, Boston, Mass.
We claim a compact encased package of two or more paper lamp shade blanks, having a single margin prepared with a dried gum or cement, and with the margins or ends left ununited, substantially as and for the purposes described.

84,290.—CLOTH MEASURING APPARATUS.—Samuel B. Luckett, Corydon, Ind.
I claim the cylinder, B, arranged as described, cylinder, C, with rod, e1, and hooks, e2, and rod, D, the whole being combined and operated substantially in the manner and for the purpose set forth.

84,291.—ANIMAL TRAP.—Harmon F. Lushbaugh and Oscar Z. Hard, Mount Pulaski, Ill.
We claim, 1st, The combination of the shaft, B, coil spring, b, rods, m, m1, m2, m3, m4, o, and n, n1, n2, n3, platform, p, with its springs, q, link, l, and pawl, r, as and for the purpose specified.
2d, The combination of the platform, t, links, v and x, levers, w and z, rock shafts, E and F, with their lance heads and weight, as and for the purpose specified.
3d, An animal trap, formed by the combination of the parts hereinbefore described, as and for the purpose specified.

84,292.—WATER WHEEL.—Theodore W. Mahler, Rome, N. Y. Antedated November 9, 1868.
I claim, 1st, The double scroll, constructed and arranged in relation to the wheel, substantially as described.
2d, The extension gate, F, F2, constructed and arranged to operate as described.

84,293.—WATER ELEVATOR.—Cornelius W. L. Martine, Scotch Plains, N. J.
I claim, 1st, The chain, P, and buckets or cups, O, when combined, constructed, and operated, substantially as described for the purposes specified.
2d, The combination of the chain, P, buckets or cups, O, ratchet wheel, I, pawl, J, grooved wheel, F, and weight, H, constructed and operated substantially as shown, for the purposes indicated.
3d, In combination with the subject matter of the second claim, the shaft, C, box, A, and crank, N, for the purposes set forth.

84,294.—HORSE SHOE.—Samuel Mason, Newark, N. J.
I claim the rib, b, indentation, c, the pin, d, and the corresponding groove, e, when combined in the manner and for the purpose specified.

84,295.—SAFETY STOVE FOR RAILROAD CARS.—William C. McGill and William Knox, Cincinnati, Ohio.
We claim, in combination with the fire chamber, the upper and lower water reservoirs, H and A, substantially as set forth.

84,296.—SEEDING MACHINE.—Lynfred Mood, (assignor to Titus and Bostwick), Ithaca, N. Y.
I claim, 1st, the arrangement and construction of the bars, P P, fast to a cross bar, anterior of and extending to the rear of the carriage axle, but are not fixed to it, for the purpose of obviating the jar of the seed box, A, by the carriage wheels as set forth.
2d, Moving the sliding bars, H and I, in opposite directions at the same time, when made and used substantially as described, thereby giving great motion to the sowing bars, as set forth.
3d, The arrangement of the double crank, C, over and transverse to the center of its motion, for the purpose of moving the sliding bars, H and I, in opposite directions, as set forth.
4th, Attaching the agitators, G, to the bar H, when said bar H is used for the twofold purpose of agitating the grain, etc., and for forming part of the throat, as set forth.
5th, The arrangement of the hinged leaf, J, so as by the described means to regulate the throat made by the leaf and the sliding bar, H, as described.
6th, The construction and use of the lever, K, and its set screw clamp, for the purpose of setting the throat by the leaf, J, as set forth.
7th, The arrangement on the end of the leaf, J, of one or more springs, M, for the purpose of evening the sowing, as set forth.
8th, The combined whole, made and arranged of the carriage, B, the seed box, A, bars, H and I, and double crank, C, substantially as described.

84,297.—POTATO DIGGER.—F. A. Morley, Syracuse, N. Y.
I claim, 1st, a rotating cylinder, I F, sustained wholly by a central spindle, f, with arms, I I, only, which are projected from the said spindle considerably in the rear of the screen, F, when combined with the shovel, H, as herein shown, and for the purpose described.
2d, A crank axle, C c, having a driving shaft, E, working through the center of its crank wrists, c c, as shown in fig. 4, in connection with the driving wheels, B B, frame, A g, and screen, F, all constructed and operating substantially as and for the purpose set forth.

84,298.—WATER INDICATOR FOR STEAM BOILERS.—Adolphus F. W. Neynaber, Philadelphia, Pa.
I claim the construction and arrangement of rod, B, bracket, E, and pipe, F, substantially in the manner described.

84,299.—MODE OF POLING HOPS.—Garret J. Olendorf, Middlefield, N. Y.
I claim the poles, A, hill stakes, B, and cords, C, when arranged as and for the purposes herein set forth.

84,300.—SPRING BED BOTTOM.—Henry H. Palmer, Rockford, Ill.
I claim the bed bottom described, consisting of the frame, A, with cross pieces, E, slats, c, with straps, B, and projections, G, springs, F, and band, D, the whole being combined and arranged as and for the purpose set forth.

84,301.—MACHINE FOR PRODUCING WEAVER'S CUT MARKS.—William G. Perry, Manchester, N. H.
I claim the shaft, b, with the wire, a', or its substitute, attached, and trough, a°, and the disk and sweep by which the wire is brought from its state of immersion in the color trough into contact with the web of yarn, all substantially as and for the purpose set forth.

84,302.—SAP SPILE.—Charles C. Post, Hinesburg, Vt.
I claim the sap spile, constructed with the longitudinal fins, B, whereby it may be held or retained in the tap or hole in the tree, without materially interfering with the flow of the sap, substantially as herein set forth.

84,303.—DEVICE FOR PREVENTING HENS FROM SCRATCHING.—Eli Rice, West Northfield, (assignor to himself and N. H. Richardson), Fitchburg, Mass.
I claim the within-described device for preventing fowls from scratching.

84,304.—ANCHOR.—Carl Wilhelm Roeden, San Francisco, Cal.
I claim, 1st, An anchor, constructed with its fluke arms, B, divided in two pieces, and attached to the shank, A, as described.
2d, The use of metal balls, G, as a means of pivoting the arms on the shank, the whole as herein described, and for the purposes as set forth.

84,305.—MOLDING GEAR WHEELS.—Warren Rowell, (assignor to himself and John Heck), New York city.
I claim, 1st, Molding my double gear wheel, A, with the groove between the two series of teeth, by in effect dividing the core into parts or steps, and mounting the parts alternately in the opposite flasks, and forming them of green sand at the same time the main parts are formed, substantially as for the purposes herein set forth.
2d, The introduction of an elastic substance between the pattern and plate, as described.

84,306.—PAPER CUTTING MACHINE.—George H. Sanborn, New York city.
I claim the combination of the knife bar, H, gears, F F', and worm wheels, D D', constructed and operating in the manner and for the purpose specified.

84,307.—PAPER CUTTING MACHINE.—George H. Sanborn, New York city.
I claim, 1st, The combination of the knife, c, and the swinging arms, b b', when the latter are arranged, relatively to each other, in the manner described, for the purpose specified.
2d, The arrangement and combination of the rod, p, arm, b, rock shaft, e, and lever, q, as and for the purpose described.
3d, The rubber, r, attached and adjusted as described, for the purpose of arresting the motion of the knife, as set forth.

84,308.—CAR HEATING STOVE.—Ethiel Sanger, Alton, Ill.
I claim, 1st, The stove, A, tubes, C, and reservoir, D, when arranged as herein described, and for the purpose set forth.
2d, The arrangement of the float, E, valve or damper, b, and the connecting devices, c, c1, c2, as and for the purpose set forth.

84,309.—POTATO PLANTER.—Norman B. Sherwood, Millville, N. Y.
I claim, 1st, The tube, A, in combination with the carrying chain, B, or its equivalent, and elevating cups, C, or their equivalent, arranged substantially as and for the purpose set forth.
2d, In combination with the above, the hopper, D, constructed and operating as herein shown, and for the purpose described.

84,310.—SLEIGH AND BABY CARRIAGE.—Louis Shmetzer, Chicago, Ill.
I claim the combination of the removable carriage body, A, and wheels, D C, with the sled runners, B, when constructed and arranged as herein described, for the purpose of easy conversion into a child's carriage or sled, at will.

84,311.—RING FERRULING MACHINE.—John Siddons, Rochester, N. Y. Antedated November 7, 1868.
I claim, 1st, The lever, O, upright slide, W, and arm, y, with its swaging rib, c2, in combination with the grooved die, C, all constructed and arranged as and for the purpose set forth.
2d, The combination of the cutting and forming dies, C, c2, and K, constructed and operating substantially as shown and described.

84,312.—RAILROAD CAR STOVE.—James Spear, Philadelphia, Pa.
I claim the arrangement of the valves, A A, on the top plate of the stove, in such a manner as to allow the stove pipe to extend through the cold air pipe, substantially as and for the purposes set forth.

84,313.—ADJUSTABLE PRESS.—Norman C. Stiles, Middletown, Conn.
I claim the method herein described, or its equivalent, of adjusting and fastening the eccentric to the lever or working part, and allowing to the supporting or crank pin freedom to rotate in the body of the eccentric, or in its own bearings, substantially as described.

84,314.—GUN LOCK.—John Stokes (assignor to Wesson Fire-Arms Company), Springfield, Mass.
I claim the construction and arrangement, relatively to each other, of the main spring and the tumbler in the locks of fire-arms, whereby the hammer, after delivering its blow, is made, by the action of the main spring, to rise or return sufficiently to relieve the nipple, firing pin, or cartridge, substantially as and for the purpose set forth.

84,315.—HORSE RAKE.—O. O. Storle and Lorens Swenson, Norway, Wis.
We claim, 1st, Hinged cap, I and bolt, M, in combination with spring, K, substantially as described.
2d, Tooth, F, passing through bolt, M, with its end passing up through hinge, I, substantially as and for the purpose specified.

84,316.—CARRIAGE SPRING.—A. C. Stowe, San Jose, Cal.
I claim the shafts, E E, with their cranks or bent arms, d and g, and the connecting rod, c, together with the links, e e, and rods, b, the whole operating on the springs, D, as an equalizing device, substantially as herein described.

84,317.—STRAW CUTTER.—Edward Strothman and John Strothman, Milwaukee, Wis.
We claim, 1st, Pitman, H, shaft, I, frame, K, rollers, L L, knife, M, lever, N, arranged and combined substantially as described.
2d, Wheels, C C', bands, D, feed lever, E, spring, F, and knob, G, all combined and arranged substantially as described.

83,318.—IRON FENCE.—Andrew Terry, Waterbury, Conn.
I claim the combination of the posts and stumps, a a' with the collars, d d', tube rail, c, and pickets, e, substantially as shown and described and for the purpose set forth.

84,319.—CAR-WINDOW VENTILATOR.—Wm. Thompson, Dublin, Ireland. Patented in England Nov. 11, 1867.
I claim a dust blind and ventilator consisting of two or more rows of troughs or trough-shaped tubes, m', set in a suitable frame work, constructed and arranged substantially as and for the purposes hereinbefore set forth.

84,320.—BOILER-TUBE SCRAPER.—Charles W. Tremain, Chicago, Ill.
I claim the boiler-tube scraper, consisting of the opening disks, A' A", chamber, D, spring, C, guides, F, and lips, E, connected to rod, I, arranged substantially as set forth.

84,321.—ADJUSTABLE FLOODGATE.—Newell Tupper, Grand Blanc, Mich.
I claim the combination of the parts, C D E G H I J, in a water gate, substantially as and for the purposes set forth.

84,322.—COMPOUND FOR TREATING RINGBONE, SPAVIN, ETC., in Horses.—W. H. Vance, Corydon, Ind.
I claim the composition of matter herein described when the same is prepared and used in manner and form substantially as herein set forth.

83,323.—HAT VENTILATOR.—William F. Warburton, Philadelphia, Pa.
I claim the within described ventilator composed of the non-elastic flexible strips, A and B, secured together, so as to leave a crescent-shaped opening, a, substantially in the manner and for the purpose described.

84,324.—CANE AND WILLOW STRIPPER.—A. F. Ward and J. H. Bean, Marietta, Ohio.
We claim, 1st, The cane stripper described, consisting of the plates, A B, standards, c, scrapers, D, and springs, e, all being constructed and operated substantially as and for the purpose set forth.
2d, The plate, B, with catches, b, in combination with the adjustable catch, B1, when operated in connection with a mill frame, as described.

84,325.—FELTED TUFTED FABRIC.—John T. Waring, Yonkers, N. Y.
I claim the new and improved manufacture of tufted fabrics, consisting of tufts secured in a previously manufactured back of felt or woven cloth by the process of felting, substantially as hereinbefore described.
Also, the tufting needles, or either of them, in combination with the tuft-holders.

84,326.—JOURNAL BEARING FOR RAILROAD CARS.—Isaac P. Wendell (assignor to Ebert J. Wendell), Philadelphia, Pa. Antedated May 25, 1868.
I claim the journal bearing, A, constructed with an oil chamber, B, and tubes or openings, C, which are provided with a cord, D, or other fibrous material, substantially in the manner and for the purpose set forth.

34,327.—PAINT BRUSH.—Darius White, Portland, Me.
I claim the disk, d, when made of leather, or any equivalent substance, when used in the manufacture of brushes in the manner as and for the purposes specified.

84,328.—REIN HOLDER.—Chas. Whittaker, Milwaukee, Wis.
I claim a rein-holder, consisting of the parts, A B and C, substantially as described.

84,329.—METHOD OF INSERTING INDIA-RUBBER IN HUBS OF Carriages.—G. F. Wilson, East Providence, R. I.
I claim, 1st, The employment, in the hubs of carriage wheels, such as described, of a metallic lining, interposed between the india-rubber, or other elastic substance, and that portion of the hub in which said elastic substance is held, substantially as and for the purposes set forth.
2d, The combination, with the rubber or other elastic bearing and chambered hub, of a metallic lining, constructed as herein specified, so that while its larger end will line the sides and end of the chamber in which the rubber is held, its smaller end will extend back more or less into the interior of the hub, as and for the purposes set forth.

84,330.—ROAD SCRAPER.—J. F. Winchell, Springfield, Ohio, assignor to himself, G. C. Steele, and L. A. Simons.
I claim, 1st, The pivoted lever, D, in combination with the frame, arranged to lock against the stops, m n and l, and provided with the chain, E, for operating it, substantially as described.
2d, The stops, m n and l, arranged to operate as described, for the purpose of holding the scraper in the different positions, as set forth.
3d, Providing the scraper with the adjustable stops for adjusting the handle at various angles or hights, substantially as and for the purposes set forth.
4th, The manner of securing the frame to the scraper, by means of the notch in the corner of the bars, C, and metal strap, a, arranged as described.

84,331.—HAND PLOW.—Jesse Winecoff, Berlin, Pa.
I claim the combination of two wheels, I, going before, a single plow, 10, together with a pivoted and adjustable beam, 3, and spring, 5, arranged in the manner described and for the purposes set forth.

84,332.—APPARATUS FOR CARBURETING AIR.—J. S. Wood, Philadelphia, Pa.
I claim, 1st, A carbureter, E, which is composed of an inverted cup and a number of independent concentric chambers formed by concentric rings projecting from its bottom, and which is suspended from the case, A, of the apparatus by means of an adjustable spring, substantially in the manner and for the purposes described.
2d, The construction of a carbureter, E, having a number of independent carbureting chambers or cups in its bottom, with a central guide tube, e, and side tubes, e", leaping therefrom into the central chamber, e4, substantially as described.
3d, The condenser, G, air inlet pipe, C, draw-off cock, W, and central guide pipe, d, in combination with a suspended agitator and carbureter, substantially as described.
4th, While not claiming broadly a floating carbureter, I do claim a cupped carbureter, which is suspended and balanced in the volatile liquid by means of a spring arm, T, substantially as described.
5th, The condensing chamber, S, interposed between the chamber in which the receiver, O, works, and the chamber in which the air is carbureted, said chamber, S, being in communication with the receiver, O, and also with the service pipe, R, substantially as and for the purposes described.
6th, The discharge tube, V, leading from the condenser, S, into the tank, D, substantially as and for the purposes described.
7th, The combination of the receiver and its valve, operating substantially as described, in a chamber, L, with an agitator and carbureter, which is constructed and suspended so as to operate substantially as described.
8th, A combined carbureter, regulator, and condenser, constructed and operating substantially as described.

84,333.—APPARATUS FOR REFINING IRON AND MAKING Steel.—John Absterdam, New York city.
I claim the combination of the nozzle, F, and conical spout, E, either one or both of which may be made movable toward or from each other, with the suction pipe, C, and converter, A, substantially as and for the purpose herein shown and described.

84,334.—PROCESS FOR REFINING IRON AND MAKING STEEL.—John Absterdam, New York city.
I claim the within described process of refining iron and making steel by exposing the molten metal in the converter to the combined action of a current of air produced by suction, and of a current of air produced by force, substantially as and for the purpose set forth.

84,335.—APPARATUS FOR MAKING STEEL AND REFINING Iron.—John Absterdam, New York city.
I claim, 1st, The spark arrester, B, in combination with the converter, A, substantially as and for the purpose set forth.
2d, The tubular pivot, b, in combination with the spark arrester, B, steam pipe, d, and exhauster, C, substantially as and for the purpose described.
3d, The chamber, D, having a rising and falling motion in its socket, m, in combination with an air or gas-supply pipe, one or both, and with the converter, A, substantially as and for the purpose set forth.
4th, The arrangement of nipples, s, in the chamber, D, substantially as and for the purpose described.
5th, The movable plugs, t, in combination with rising and falling chamber, D, substantially as and for the purpose set forth.
6th, The pipe, r, connecting with an air-forcing apparatus, in combination with the converter, A, and exhauster, C, substantially as and for the purpose described.

84,336.—PROCESS FOR INTRODUCING GAS FUEL INTO A CONverter for Making Steel and Refining Iron.—John Absterdam, New York city.
I claim the process, herein described, of introducing fuel into the molten metal in a converter by suction.

84,337.—FOLDING BEDSTEAD.—Calvin P. Alling, Jr., Sylvan, Wis.
I claim an improved folding bedstead, formed by the combination of the hinged posts, A, hinged side bars, C, cross slats, D, jointed longitudinal bars or slats, E, hinged or pivoted elbow straps, F, and hooks, G, with each other, said parts being constructed and arranged substantially as herein shown and described and for the purpose set forth.

84,338.—CULTIVATOR.—T. Arndt (assignor to himself and E. L. Flowers), Mount Joy, Pa.
I claim, 1st, The ring or ring plate, D, in combination with the central or main beam, A, of the cultivator, and with the hooked forward ends of the side or adjustable beams, E, substantially as herein shown and described and for the purpose set forth.
2d, The combination of the curved and slotted bar, H, slotted bolts, I, clips, J, and nuts, K, with the central beam, A, and with the adjustable side beams, E, substantially as herein shown and described and for the purpose set forth.

84,339.—HARROW.—Moses Atwood, New Sharon, Iowa.
I claim, 1st, The pivoted or hinged bar, E, having notches or catches, e', formed upon its lower side, and the cams, F, in combination with each other and with the frame, A, and toothed shafts, B, substantially as herein shown and described and for the purpose set forth.
2d The combination of the arms or teeth, D, with the shafts, B, and teeth, C, substantially as herein shown and described and for the purpose set forth.
3d, An improved harrow, formed by the combination of the frame, A, shafts B, teeth, C, arms or teeth, D, pivoted or hinged bar, E, having notches or catches, e', upon its lower side, cams, F, and lever, G, with each other, substantially as herein shown and described and for the purpose set forth.

84,340.—HARVESTER.—John Blue, Trumansburg, N. Y.
I claim, 1st, The combination of the lock, consisting of the curved plate, C, bolt, b, and spring, d, or their equivalents, with the staff, B, joint, I, shaft, K, and pulleys, f and l, when these several parts are arranged for operation, substantially in the manner described for the purpose specified.
2d, The combination of the toggle joint, F, with the slide, E, and pulleys, f l and g, when these several parts are arranged for operation, substantially in the manner described for the purpose specified.
3d, The combination of the lock, consisting of the curved plate, H, bolt, k, and spring, e, or their equivalents, with the toggle joint, F, slide, E, and pulleys, f l and g, when these several parts are arranged for operation substantially in the manner described for the purpose specified.

84,341.—METHOD OF PREVENTING THE ALTERATION OF NUMbers on Bonds, etc.—G. W. Casilear, Washington, D. C.
I claim printing numbers in parentheses, or between any other marks or forms, on a fugitive ground or background, tint, or color, thus effectually preventing alteration of the figures or numbers, as substantially set forth.

84,342.—HARROW.—John Chase, Farmington, Pa.
I claim the arrangement and combination of the several parts, B D E E, substantially as herein shown and described.

84,343.—RESERVOIR COOK STOVE.—Sarah M. Clark, Beaver Dam, Wis.
I claim the arrangement, with reference to the stove, A, of the flanged top frame, B, rotating top, C, whose upper surface is a plane, the stove hearth, M, extending along both sides of the stove body, at both ends of the fire box, the concavo-convex reservoir, J, and the oven, L, as herein described for the purpose specified.

84,344.—FOLDING CHAIR.—Adam Collignon, Closter, N. J.
I claim, 1st, In combination with a folding chair, the straps, l, connecting the arms with two of the legs of the chair in such a manner as to allow the chair to be folded, substantially as described.
2d, The arms, G, hinged to the back, and connected with the legs, B, substantially as specified.

84,345.—GRAIN SCREEN.—J. J. Crider, Greenfield, Ind.
I claim, 1st, The head, e', provided with cups, H, and apertures, h, adapted to collect and deliver the grain, substantially in the manner shown and described.
2d, The worm or spiral conveyer, i, in its application to the feed end of a rotating grain-screen, and adapted to feed the grain in regular quantity, substantially as described.

84,346.—POUNCE HOLDER.—Robert Cushman, Pawtucket, and J. R. Dennis, Central Falls, R. I.
We claim, as a new article of manufacture, a paper smoothener consisting of the handle and bag, substantially as herein shown and described.

84,347.—REVOLVING PUDDLING FURNACE FOR TREATING Iron and Steel.—S. Danks, Cincinnati, Ohio.
I claim, 1st, The hollow ribs, L, and protuberances, M, either or both, in the metal shell of the rotary refining cylinder, I, forming, on the outside, troughs or pockets for the reception of water, in the manner and for the purposes set forth.
2d, The shiftable piece, P, employed, in combination with a rotary refinery, for the double purpose of a door and a flue, as described.
3d, The arrangement and adaptation, substantially as described, of the water bridge, G H, in combination with the fire chamber, A, and rotary puddling chamber, I, for the purpose set forth.

84,348.—HORSE POWER.—Milton Fisk, Sparta, Tenn.
I claim, 1st, The table, C C', arranged as shown, and provided with the adjustable spindles, D and G, and the operating shaft, E, and its wheels, in combination with the wheel, B, and bed, A, all substantially as and for the purpose described.
2d, The combination, with the movable table, C C', and spindle, G, of bed stone, H, substantially as and for the purpose described.
3d, The combination, with the spindle, G, of the socketed shaft, I, substantially as and for the purpose described.

84,349.—MILLSTONE DRESS.—James W. Gaines, Clarksville, Texas.
I claim the millstone dress, formed by the annular beveled furrow, a, the leading furrows, b, passing through the annular furrow, the radial furrows, c, connecting with the leading furrows at an angle, and the secondary furrows, d, all laid out in the manner herein shown and described.

84,350.—TENONING MACHINE.—William Gilmore, Hudson City, N. J.
I claim the combination of the pawl arm, d, vertically sliding rod, c, and pawls, d1 d2, with the vertical carriage, C, all arranged and operating as described for the purpose specified.

84,351.—COMBINED HAMMER AND NAIL HOLDER.—R. W. Green, Bradford, Pa.
I claim the jaws, A and C, secured to the hammer handle by the plate, L, constructed and arranged to operate as and for the purpose set forth.

84,352.—DEVICE FOR HOLDING DOORS OPEN.—W. W. Green, Jr., (assignor to himself and E. Brown), Janesville, Wis.
I claim the holder having the bifurcated end, d d, adapted to fit within the plate, e, attached to the door, and with a shoulder at the inner end of the bifurcation, by which the knob, A, is held to the washboard, B, as constructed and shown.

84,353.—DRILLING JARS.—Edward Guillod, Titusville, Pa., assignor to Bryan, Dillingham & Company.
I claim the within described drilling jars, consisting of a single link and bolt, constructed of wrought iron and steel, combined and applied substantially in the manner represented, and for the purposes set forth.

84,354.—DOG POWER.—A. W. Hager, and John H. S. Grove, Waverly, Iowa.
We claim the combination of the extensible working beam, I J, weight, H, connecting rod, K, crank, L, drums, C C', rollers, D, adjustable bearings, S, and the endless belts, consisting of the transverse slats, O, and the pivoted buttons, e, arranged to break joints with each other, all operating as described, for the purpose specified.

84,355.—PUMP.—Thomas Hansbrow, deceased, Sacramento, Cal. (Lucy A. Hansbrow, and B. B. Redding, executors.)
I claim, 1st, The valves, F, when their pivots, a, are adapted to fit in recesses formed in the walls of the valve chamber, whereby the heel of said valves has a vertical play while swinging upon said pivots, as herein described for the purpose specified.
2d, The pump barrel, A, water chest, B, and valve chest, all cast in one piece, and arranged as described, for the purpose specified.

84,356.—HOT AIR FURNACE.—S. J. Hare, Louisville, Ky.
I claim the described arrangement of the annular outer drum, H, formed by the cylinders, I J, and supported above the combustion chamber, C, by the short pipes, k, the central chamber, L, containing the perforated plate, m, the air pipe, N, and pipe, O, connecting the chamber, L, and drum, H, the damper, S, combustion chamber, C, and fire chamber, B, all constructed and operating as described, for the purpose specified.

84,357.—SNOW PLOW.—Hiram Harris, Circleville, Ohio.
I claim the snow plow, B, the mold boards, b', of which are constructed substantially in the form and manner herein shown and described, and which is detachably secured to the pilot, A, by the bar or plate, C, shackle bar, D, and side arms or bars, E, substantially as and for the purpose herein set forth.

84,358.—MACHINE FOR CLEANING ENTRAILS.—John Adam Huss, Louisville, Ky.
I claim, 1st, The counter revolving rollers, A B, armed with scraping edges, a a a, or the equivalent thereof, all substantially as shown and described, in combination with any curved surface or surfaces, D E, all as set forth.
2d, The feed rollers, H H, in combination with the scraping rollers, A B, substantially as described and for the purpose set forth.
3d, The gear wheels, J K a L, and crank wheel, M, substantially as described, in combination with the rollers, A B, scraping edges, a a a, and surfaces D E, all as and for the purpose set forth.

84,359.—METHOD OF CONSTRUCTING CHAINS.—J. George Jung, Newark, N. J.
I claim, as a new article of manufacture, a chain, constructed of links having two heads and two apertures, in the above described location to each other, and the links being interlinked, substantially as specified.

84,360.—HORSESHOE.—Lucien H. Kellogg, Monroe, Ohio.
I claim the described construction of the horseshoe, having the flange, B, extending entirely around its under side, forming a rest for the front end of the toe calk, C, and adapted to receive the dovetailed heel calks in such manner that they shall rest upon the flange, longitudinally of the same, as herein shown and described.

84,361.—SWAGE FOR SAWS.—William A. L. Kirk (assignor to Owens, Lane, Dyer, & Company), Hamilton, Ohio.
I claim the swage, consisting of jaws, a and f, and annular or movable die, K, all constructed and arranged as shown and described, for the purpose set forth.

84,362.—DOOR FASTENING AND ALARM.—A. F. Kitchen, Shelton Depot, S. C.
I claim an improved door fastening and alarm, formed by the combination of the hinged plate, F, bar or plate, E, chain, G, or equivalent, lever, I, and spring, K, with each other, and with the hasp, C, attached to the door frame, B, and staple, D, attached to the door of the outhouse to be protected, and with the gun or pistol, J, placed in the dwelling, substantially as herein shown and described, and for the purpose set forth.

84,363.—COVER FOR CIRCULAR VESSELS.—John Kline, Rochester, N. Y.
I claim a rotating semicircular cover for pails, etc., moving in a groove, and pivoted to a fixed semicircular cover, substantially as described, for the purpose specified.

84,364.—FRAME FOR TRAVELING BAG.—Samuel Lagowitz, Newark, N. J.
I claim a traveling bag frame, made of sheet metal, each jaw having one edge doubled up, and the other provided with a wire, the ends of which form the joints on which the jaws open and close, substantially as shown and described.

84,365.—DRESSING SAW TEETH.—John Lough, Buckingham Village, Quebec.
I claim, 1st, Widening the saw tooth at its under side, in such a manner that the expanded cutting face thereby produced is parallel sided, or in the form substantially as shown in fig. 10, and as in hereinabove described, for the purpose set forth.
2d, The plates, c c, when united by the bolts, d d, and provided with the projections, e e, and the arm, b2, and having between the space, f, and the space for the compression bar, substantially as described.

3d, In combination with said plates, c c, constructed as above described, the lever, h, pivoted at h1, the strap, h3, the compression bar, l, and the die, k, all operating together in the manner and for the purpose set forth.

4th, In combination with said plates, c c, constructed as above described the wedge, g1, lever, g2, strap, g3, key or equivalent, g4, eccentrics, g5, and pivots, g6 g7 g8, all operating together substantially as and for the purpose set forth.

5th, The improved saw dressing machine, herein described, consisting of the bed plate, o, top plate, o, top plate, p, clamp, q, plane, r, iron strap or file holder, s, adjustable strip, v, and adjusting screws, v', all arranged and working together substantially in the manner and for the purpose described.

84,386.—REMOVABLE HEAD FOR BOXES, ETC.—Samuel Macferran, Philadelphia, Pa.

I claim the combination of the lever D having an elliptical or wedge-shaped projection, c, with one end of the tightening strap, C, and the slotted piece, F, with the other end of the strap, substantially in the manner above described, and for the purpose specified.

84,367.—THRESHING AND GRAIN SEPARATING MACHINE.—Miller, Canton, Ohio.

I claim, 1st, In combination with the straw carrier, the toothed beater, D, revolving in a direction contrary to that of the motion of the straw carrier, so as to lift up and throw over the straw, substantially as and for the purpose described.

2d, Also, in combination with the straw carrier and the cylinder, D, for throwing over the straw, the perforated board, e, to prevent the straw from driving into or between the slats of the carrier, and to carry and deliver the grain to the screens, substantially as described.

3d, Also, in combination with the straw carrier, the double pickers, or beaters, h 1, at the upper end thereof, as and for the purpose substantially as described.

4th, Also, the construction of the picker or beater, I, namely, of the central shaft, the heads, and the rods or wires, as described and represented.

5th, Also, supporting the lower end of the straw carrier upon adjustable journals, and without a cross shaft, as and for the purpose described and represented.

84,368.—DROPPING PLATFORM FOR HARVESTERS.—Jacob Miller, Canton, Ohio.

I claim the combination of the pivoted platform, the flexible apron, and the traveling belts, united to each other, as herein described, so that the tipping of the platform shall bring the holding apron into action, and the returning of the platform into its receiving position, move the apron out of action, substantially as herein described.

84,369.—COMPOUND OF RUBBER OR GUTTA-PERCHA.—J. B. Newbrough, N. Y.

I claim, as a new composition, gutta percha, or india rubber, combined with clay, iodine, and wolfram or tungsten oxide, substantially as described.

84,370.—EXHAUST NOZZLE FOR STEAM ENGINES.—John Sanders, Harrisburg, Pa., administrator of the estate of Richard Norris, deceased.

I claim the arrangement of the valves, c c, rods, d d, springs, e e, partition h, and exhaust pipes, b b, constructed as described.

84,371.—ROTARY STEAM ENGINE.—Ferris Ogden, Meadville, Pa.

I claim, 1st, The two halves, A A, the ring, m, the arm, j, and the piston, C, constructed as described.

2d, The abutment, D, constructed as described.

3d, The thimble, h, and the plug valve, G, constructed as described.

4th, The steam chest, I, constructed as described.

5th, The arrangement of the parts designated in the foregoing clauses of the claims, constructed as described.

84,372.—BAGGAGE CHECK.—Enoch Haile Paine, Louisville, Ky.

I claim the baggage check, attached to the ticket, and corresponding in number with the number of the ticket, as herein set forth.

84,373.—BREECH LOADING FIREARM.—William Rochester Pape, Newcastle-upon-Tyne, England.

I claim the cartridge extractor, a, provided with rabbets, a', guide rods, d d', and beaded or flanged tongue, b, substantially as and for the purpose described.

84,374.—ROOT CUTTER.—G. S. Perfater, Camp Point, Ill.

I claim, 1st, The revolving cutter, A and fixed cutter, G, when constructed and operating substantially as described.

2d, The pivoted plate, E, and curved shank, H, having a slit, d, in combination with the revolving cutter, A, and fixed cutter, G, substantially as described.

84,375.—SEED SOWER.—Gottfried Rank, Greenleaf, Minn.

I claim, 1st, The seed or wind protector and scatterer, K, in combination with the cylinder, G, flanged rod, H, and hopper, D, substantially as described for the purpose specified.

2d, The combination and arrangement of the perforated slides, Eh, cylinder, G, and rotating rod, H, provided with cavities, d, substantially as and for the purpose set forth.

84,376.—EXTENSION POLE AND HOLDBACK EOR CARRIAGES.—W. W. Rexford, Loch Sheldrake, N. Y.

I claim the sliding tube, C, holdback, D, and spring catch, E, E b, in combination with the perforated tube, B, affixed to the end of the pole, said tubes being prevented from turning one upon the other, by means of the feather, a, all constructed and operating as described, for the purpose specified.

84,377.—FORK BLANK.—J. C. Richardson, Ilion, N. Y.

I claim the blank, A, formed by punching or otherwise severing it from a bar of suitable width, with the space, e e'' slits, c, and shoulders, f, substantially as and for the purpose described.

84,378.—CARRIAGE SPRING.—Benjamin H. Roberts, Fall River, Mass.

I claim, 1st, In combination with the elliptic springs, B B, the C springs, F F, formed by an extension of the ends of the elliptic springs, substantially as described.

2d, In combination with the C springs, F F, formed by an extension of the elliptic springs, the braces or brackets, G G, for connecting the C springs to the body of the carriage, substantially as described.

3d, The arrangement of the axle and rocker between two parts of the elliptic springs, substantially as described, and for the purposes set forth.

84,379.—SLEIGH BRAKE.—Milton Satterlee, Richland Center, Wis.

I claim the combination of the arm plates, e e', with the spur wheel, w, and the means for raising or depressing it, when used as a brake in connection with a sleigh or sled, in the manner described.

84,380.—REVOLVING COULTER FOR PLOWS.—Marshall Satley, Taylorsville Ill.

I claim, 1st, The slotted upright, D, constructed substantially as herein shown and described, and for the purpose set forth.

2d, The wrist or swivel bolt, C, constructed substantially as herein shown and described, and washers, E, in combination with the slotted upright, D, and slotted end of the swiveled arm, B, as and for the purpose set forth.

84,381.—INSECT NET.—Charles B. Seaman, Honesdale, Pa.

I claim the frame, A, having bows, a, or rods, d, and provided with a netting, which is secured by rods, c, and eye bolts, b, all substantially as described, as a new article of manufacture.

84,382.—REVERSIBLE LATCH.—George H. Seaver, N. Y. city.

I claim the flexible tail piece, c, constructed and arranged substantially as described, and for the purpose specified.

Also, in combination with a reversible latch and flexible tail piece, the application of the spring, e, for the return of movable followers to their proper position.

84,383.—PILE DRIVER.—Thomas Shaw, Philadelphia, Pa.

I claim, 1st, A suitably guided hammer, G, in combination with a cylinder, R, all constructed, arranged, and operating in the manner and by the means described, and for the purpose set forth.

2d, The rack, C, pawl, K, and spring, L, in combination with the hammer, G, all constructed and arranged as described, and for the purpose specified.

84,384.—BOTTLE FILLING APPARATUS.—Peter M. Sherwood, New York city.

I claim, 1st, The valves, as arranged on the interior and exterior ends of the siphon, E, said siphon being combined with a reservoir, substantially as described.

2d, The valve, I, arranged as described, on the delivery end of the siphon, H, with the collars m o, spring, p, and yoke, n, substantially as and for the purpose specified.

3d, The bayonet fastening, z, in combination and arranged with the tapering valve, v', the spiral spring, and the sleev, w, having the enlarged portion, y, and the flange, x, adapted to fit upon the mouth of the bottle, all operating as described, whereby, as the bayonet catch is released, the sleeve, w, is thrown outward, to close the orifice, i, in the valve, v', as and for the purpose specified.

4th, The valve, arranged on the interior end of the siphon J, in such a manner that the operation of the siphon moves its end from the packing, v, affixed to the reservoir, and allows the liquid to flow, substantially as described.

5th, The adjustable bar, a, and shelf, B, constructed and arranged substantially as shown and described, in combination with the reservoir, A, for the purposes specified.

6th, The faucet, y, embracing the tapering valve, v', sleeve, w, and the bayonet fastening, z, substantially as described, and for the purposes set forth.

84,385.—ELEVATOR.—Thomas B. Simonton, New York city.

I claim, 1st, The combination of the scroll wheels, J, K, the platform shaft, G, inclined plates, H, and racks, L, substantially as herein shown and described, and for the purpose set forth.

2d, The combination and arrangement of the racks, L, inclined plates, H, flanged or scroll wheels or pulleys, J K, shaft, G, platform, N, band or chains, M, pulleys, E and F, shaft, D, sliding guide bars, C, ways, R, endless bands, T, and guide pulleys, P Q, pulleys, S, and band, R, with each other, substantially as herein shown and described, and for the purpose set forth.

3d, The arrangement of the mechanism, by means of which all the operating parts of the hoisting apparatus may be raised and lowered with the platform, substantially as herein shown and described.

84,386.—COMBINED CRUSHER, HARROW, AND ROLLER.—John Simpson, Charleston, Ill.

I claim the rollers, E, fitted in the frames, D, attached to the frame, A, as shown in combination with the toothed cylinders, C C, all arranged substantially as described, for the purpose specified.

84,387.—HATCHWAY.—James D. Sinclair, Brooklyn, N. Y.

I claim, 1st, The arrangement of the pulleys, a b, the cord or chain, H, and the hatches, B D F, whereby the latter are opened successively, substantially as described, for the purpose specified.

2d, In combination with the pulleys, a b, cord or chain, H, and hatches, B D F, the hooks, d, and cord, e, whereby the hatches are released simultaneously, substantially as described, for the purpose specified.

84,388.—FRAME FOR PROTECTING WATCH WORKS.—William Borthwick Smith, Coventry, England.

I claim, 1st, The means employed for facilitating the separate detachment of the escapement, to wit, the bars, L L' M', arranged and applied in the manner substantially as set forth.

2d, The bow Ax, applied to the bar, M', and in relation with the balance staff, substantially as and for the purpose set forth.

3d, The projecting cap, Bx, when arranged and applied, in relation to the pillar plates and regulator, substantially as shown and described.

84,389.—SEWING MACHINE.—M. R. Smith, Armonk, N. Y.

I claim the pivoted self-adjusting block, H, in combination with the lever, D, and the presser roller, C, substantially as described, for the purpose specified.

84,390.—PAPER RULING MACHINERY.—William C. Smith, Brooklyn, N. Y., assignor to Henry Satcliff and John E. Tucker.

I claim, 1st, The combination of the blocks, I, supports, J, and bars, M, with the smoothing plate, H, and frame, A, of the machine, substantially as herein shown and described, and for the purpose set forth.

2d, Smoothing the paper, as it passes beneath the ruling pens, by means of a smoothing plate, H, adjustably attached to the frame of the machine, substantially as herein shown and described.

84,391.—COMBINED LATCH AND LOCK.—Arnold Sprague, Poland, N. Y.

I claim, 1st, The combination of the slotted vibrating latch, A, a2, provided with a stop, b1, and the eccentric, B, with stops, D E, arranged and operating substantially as described.

2d, In combination with the said eccentric, the spring tumblers, C, and stops, D E, arranged and operating substantially as described.

84,392.—SAW COTTON GIN.—William Sutton, Washington, Ga.

I claim the hopper, A, constructed as described, with its sides inclined, for the purpose of supplying the cotton to all the saws equally, as herein shown and described.

84,393.—WATER WHEEL.—William E. Tate, Cambridgeport, Mass.

I claim the top plate, E, with its channel or passage, in combination with the suspended or pivoted pendant buckets, c, of the wheel, B, the groove, dx, in the case, A, the abutment, e, within said groove, and the induction and eduction pipes, C D, all arranged to operate in the manner substantially as and for the purpose set forth.

84,394.—WATER WHEEL.—S. J. Thomas, Dawson, Ga.

I claim the wheel composed of sections or segments, A, with buckets, B, the segments joined by means of the projections, a e c, fitting into the recesses, b t d, all constructed and arranged in the manner set forth.

84,395.—WASH BOILER.—C. Arthur Totten, Hudson, N. J.

I claim, 1st, The braces, B, when arranged to strengthen the corners and provide a channel for the rising water also, substantially as and for the purposes specified.

2d, The flange, D, the brace, B, and short tube, E, in combination with the boiler sides substantially as described and set forth.

3d, The porous cover, L, when provided with the hinges at its center, in connection with the grooves, M, substantially as and for the purposes specified.

84,396.—GOVERNOR FOR STEAM ENGINES.—Samuel Trumbore, Easton, Pa.

I claim the float, D, provided with the tumbler extension, F, and guide rollers, G, and arranged with reference to the vessel, E, and the tube, H, substantially as descibed.

84,397.—BOOK COVER PROTECTOR.—A. Van Patten, Weyauwega, Wis.

I claim a metallic protector for book covers, hinged and constructed substantially as and for the purpose herein described.

84,398.—CONSTRUCTION OF SCHOOL GLOBES.—Edward Weissenborn, Hudson City, N. J.

I claim a school globe made of two layers, A, of pasteboard, cut out to form arms, a, and placed together and united by the aid of the mold, B, all as shown and described.

Also, the strip, f, pasted to the inner surface of one hemisphere, and serving to fasten and retain the second hemisphere, substantially as set forth.

84,399.—HARVESTER.—William N. Whiteley, Springfield, Ohio.

I claim, 1st, The double pivoted crank wrist box, moving upon axes at right angles to each other, as set forth, so that the wrist pin will not be cramped in its box by any irregular movement of the pitman, as set forth.

2d, The pitman joint at the heel of the cutter bar, formed by the conical or conoidal points, and the plates, o o, secured by the bolts, p q, and stay plate, s, in the manner set forth.

3d, Jointing the inner shoe of a harvester's cutting apparatus to a rocking shaft, located transversely to and extending across the main frame, so that by moving said shaft upon its axis, the points of the guard fingers and cutters may be "set" high or low, as desired, substantially as shown and described.

4th, In combination with the shoe, R and rocking shaft, Q, the lever, q', and the standard rack, x, for the purpose of permitting the adjustment and retention of said shoe and shaft in the desired position, as set forth.

5th, Mounting the driver's seat upon two notched rails, w w, so that said seat may be shifted forward or backward when slightly raised at the back, substantially as set forth.

6th, Pivoting the platform, U, at the tops of the posts, u u, and adjusting its forward end at any desired hight by the adjusting bar, V.

7th, Arranging the two unequal sized driving wheels, C and F, with their axles about in the same vertical plane, so that neither wheel will drag when the machine is being turned, as at the field corners.

8th, The wedge-ended clutch lever, M, constructed, and operating as set forth.

9th, The notched bar, z, and lever, y, constructed and operated as set forth.

84,400.—ICE SPUR.—C. F. Wieland, Darmstadt, Ill.

I claim the combination, in a spur or creeper, of the two U-shaped plates, A and B, pivoted together by pintles, d d', and actuated by a spring within a case, C, with the spring catch, E, and pin, b, all arranged and operating substantially as shown and described, and for the purpose set forth.

84,401.—RAILWAY RAIL.—Henry Zahn, Toledo, Ohio.

I claim the hollow elastic base, B, having inwardly-inclined sides, terminating in the vertical parts, a a, between which the tongue, b, of the rail, A, is bolted, whereby the rail, B, is depressed by the weight of the passing train, causing the parts a a, to pinch the tongue, b, thereby lessening the effect of percussion and vibration in proportion to the downward pressure of the rail, as herein shown and described.

84,402.—BOOT CRIMPER.—Oliver M. Adams, Milford, Mass.

I claim the jaws, b b, with serrated or segmental rows of teeth, in straight lines, at right angles to the jaws, as described, in combination with plate, d, and clamp, a, screw, c, and screw nut, e, constructed and operating as and for the purpose set forth.

84,403.—PRINTING PRESS.—Samuel J. Baird, Staunton, Va.

I claim, 1st, A flexible frisket, to be used in combination with a flat form and cylinder impression press, substantially as and for the purposes set forth.

2d, The roller, smooth or grooved, for protecting the frisket from the ink rollers and directing its ascent, as above described.

3d, The grooved frame above described, whether fixed or made movable, so as to be adjusted to any desired breadth of frisket, holding it firmly extended, as above described, and for the purposes specified.

84,404.—PROCESS OF RECOVERING PIGMENTS, OILS, AND GUMS FROM CLOTHS USED BY ENGRAVERS.—Haydn M. Baker, New York city. Antedated November 7, 1868.

I claim, 1st, The manufacture of paints from the material contained in cloths or fibrous substances (used by engravers for wiping their plates), in the manner or by the process herein described.

2d, Also, the use of the solvents herein enumerated, or their equivalents, for the purposes set forth in the specification, *i. e.*, the manufacture of paint.

3d, Furthermore, the process herein described for the separation and recovery of oils and gums, or resinous matter.

84,405.—OIL CAN.—B. F. Barnes, Boston, Mass.

I claim the nose, C, made in two parts or sections, D and E, in combination with the wire, J, secured at one end in section, D, and extending by its other therefrom into the oil passage, through part, E, substantially as and for the purpose specified.

84,406.—LAMP BURNER.—Alfred Bliss, New York city.

I claim the combination with the burner of a kerosene or other lamp, of a removable cone or deflector, so constructed, that when the chimney and cone or deflector are in position for use, the chimney will rest upon the bead or ring and retain the cone in place, substantially as described.

84,407.—GAGE FOR MORTISING WINDOW SASH.—W. P. Boyd, Thorntown, Ind.

I claim the combination of the adjustable blocks, B B, stops or bars, C C, and slotted or grooved bar, A, all arranged as described, and operating substantially as and for the purposes herein set forth.

84,408.—SCREW PRESS.—Jonathan S. Buell, Buffalo, and Willard B. Buell, Pompey, N. Y.

We claim, 1st, The ratchet wheel, lever, pitman, and crank, in combination with the press screw, when arranged and operated substantially as and for the purpose set forth.

2d, The combination of the diagonal brace, M, with the oscillating lever, F, and screw, D, arranged so as to support the former, and permit the necessary movement of the parts, as set forth.

3d, The combination of the triangular pointed spring pin, l, and arms, b, with the double pointed pawl, G, arranged to operate substantially as and for the purpose set forth.

84,409.—HAY SPREADER.—William H. Butterworth, Trenton, N. J.

I claim, 1st, Eccentric, H, provided with a slot, c, so as to be adjusted as desired, substantially as herein described and for the purpose set forth.

2d, The combination of the adjustable eccentric, H, the rotating ring, G, and the reel, having its rake bars journalled therein, and connected by cranks, b, to the ring, G, all arranged to operate as and for the purpose described.

84,410.—NUT PLANER.—John T. Campbell, Altoona, Pa.

I claim, 1st, The combination of one or more tools, m m', and a revolving mandrel, G, all constructed, arranged, and operating together, substantially as and for the purpose set forth.

2d, The combination and arrangement of the revolving mandrel, G, sliding tool rest, E, edge planing tool, n, and the double edged tools, m m', all constructed and operating substantially in the manner described.

84,411.—SCREW TAP.—Samuel J. Mills Clark, Brookline, and John L. Farrell, Boston, Mass.

We claim the improved compound tap, made as before described, that is, having its cutting surface or series of teeth disposed in graduated sections, substantially in the manner and for the purposes shown and specified.

84,412.—GLASS MOLD.—E. W. Cooper, Williamstown, assignor to himself and Lukens Cooper, Blackwoodtown, N. J.

I claim, in a mold for forming glass vessels with screw tops, a detachable ring, D, having screw threads on its inner edge and being applied to the mold substantially in the manner described.

84,413.—CULTIVATOR.—William F. Coulter, G. F. Trabue, and W. A. Lowrey, Hardinsburg, Ind.

We claim, 1st, The V shaped brace pendants, S S, adjustable beams, G G, stiff pendants, H H, and staple guides, p p, arranged together in a cultivator, substantially as herein described.

2d, The hooked spring goose necks, F, applied to axle B, and adapted to serve for holding up the shovel carrying beams out of action, substantially as described.

84,414.—GATHERING ATTACHMENT FOR SEWING MACHINES.—John Crandell, Chicopee, Mass., assignor to Lamb Knitting Machine Manufacturing Company.

I claim the within described gathering attachment consisting of the plates, a b, constructed in the manner explained and represented, provided with the screw, d, and projection, f, and adapted for operation in conjunction with the feed and presser foot of a sewing machine as and for the purpose set forth.

84,415.—BEE HIVE.—Samuel Cuplin, Iowa Falls, Iowa.

I claim, 1st, The removable boards, F F, held in place by the strips, f, f', and used for the purpose of retaining firmly in position the comb frames and facilitating the removing of the same.

2d, The comb frames, E E, constructed, arranged, and operating substantially as described.

3d, Casing, A, cover, B, honey boxes, G G, ventilating lid, I, comb frames, E E, removable or adjustable boards, F F, strips, f and f', horizontal and inclined bottom, C, inclined board, G, and door, J, all constructed and arranged substantially as and for the purpose set forth.

84,416.—CLOVER HARVESTER.—Paul Dismukes, Gallatin, Tenn.

I claim, 1st, A machine for gathering clover or grass seed, having the adjustable fingers, C, reel, E, and cutter, D, all constructed and combined substantially as set forth.

2d, The combination of the adjustable fingers, C, and the rotating cutter, D, when said parts are constructed and arranged to operate as herein described.

84,417.—UNIVERSAL JOINT.—Alfred Duvall, Baltimore, Md.

I claim the combination of devices substantially as shown in the drawings and set forth in the foregoing specification.

84,418.—ARMOR-PLATING FOR VESSELS.—Gustav Julius Günther, London, England. Patented in England, October 25, 1867.

I claim, 1st, The combination of two or more armor plates with each other by back flanges and bolts, substantially as described.

2d, The combination of two or more armor plates with each other, by means of back flanges and bolts, and tongues and grooves, substantially as described; and this I claim both when the tongues are attached to and separate from the plates, as described.

3d, The method, substantially as described and represented, of fastening armor plates which are combined with each other by flanges and bolts, to a backing structure by means of T-shaped plates, substantially as specified.

84,419.—CORN HUSKER, SHELLER, AND STRIPPER.—Friedrich Häfelfinger and Robert N. Eagle, Washington, D. C.

We claim, 1st, The sectional bars, B B, connected by transvere bars, C C, substantially as and for the purposes set forth.

2d, In combination with the aforesaid bars, B B and C C, the spring, D, for the purpose stated.

3d, The hood, E F G G, in combination with the sectional frame, B B C C, substantially as set forth.

4th, The loops, K, for the attachment of the straps or bands of any suitable form.

84,420.—COMPOUND FOR HARDENING AND UNITING IRON AND STEEL IN THE MANUFACTURE OF PLOWS, ETC.—William Howell and N. W. Browning, Webster City, Iowa.

We claim the solution herein described, or its equivalent, when used for the purposes specified.

84,421.—COMPOUND FOR ROOFING AND PAINTING.—Nathaniel Irish, Rochester, Minn.

I claim a compound, consisting of the above-mentioned ingredients, and used substantially as and for the purpose herein set forth.

84,422.—MACHINE FOR MAKING BOXES.—Eben James (assignor to himself and W. B. Brinley), Tyngsborough, Mass.

I claim the combined arrangement of the two gangs of cutters, h h and i i, one being adjustable toward and from the other and the table, q, movable between the said gangs of cutters by means of the crank, t, pinions, v v, and racks, w w, all substantially as and for the purpose herein specified.

84,423.—LOOM.—Barton H. Jenks, Bridesburg, Pa.

I claim, 1st, The combination of the tension device, G arranged and operating substantially as described, with heddles which are held down or suspended by means of a cord and a system of sheaves, substantially as and for the purposes described.

2d, The combination of the twilling cam, K, hub, L, which is grooved circumferentially, and as described, diametrically opposing feathers, y y, on cam shaft, and the swivel, n, substantially as and for the purpose described.

3d, The combination and arrangement of the system of loom treadles, the twilling cam, the circumferentially-grooved hub, which is grooved as described, and slides, the cam shaft with two feathers, y y, and the swivel, n, substantially as and for the purpose described.

84,424.—REELING MACHINERY.—Barton H. Jenks, Bridesburg, Pa. Antedated November 14, 1868.

I claim, 1st, The combination of the folding reel bars, G G, shaft, E, circular bearing, J, with a break, P, in its rim, and groove or flanges, i i, substantially in the manner and for the purpose described.

2d, The bearing, J J p p, constructed in the manner shown and described, in combination with the groove or flanges, i i, and pin, s, for the purpose set forth.

3d, The arrangement, consisting of the oscillating bearing, J P, reel, E G, groove or flanges, i i, intermittent longitudinally-reciprocating bar, C, sizing box, B, and gearing, shown for operating the bar and reel, all substantially in the manner and for the purpose set forth.

84,425.—STEAM ENGINE WATER HEATER.—William Ashley Jones, Dubuque, Iowa, and James L. Sherman, Cassville, Wis.

We claim a valve or valves, E, applied to the several sections, D 1, of worm or coil, or pipe, which is arranged within a heater, A, substantially in the manner and for the purposes herein described.

84,426.—CORN PLANTER.—C. A. Kellogg, Elyria, Ohio.

I claim 1, The slide, L and spring, M, as arranged in combination with the lever, D, for the purpose set forth.

2, The lug, E, as arranged in combination with the chutes, I, F, and G, and operated in the manner as and for the purpose described.

84,427.—STEAM GENERATOR.—John C. Kilgore, Philadelphia, Pa.

I claim the foam-cap, c, combined with the siphon, H, and tubes, C, substantially as herein specified.

84,428.—BLOWING ENGINE.—Alexander Carnegie Kirk, Glasgow, Great Britain.

I claim the cylinder, 1, with its openings and valves, in combination with casings, 7 7, and with a hollow piston-rod or trunk extending through both heads of the cylinder, open at each end, and communicating with a hollow piston, A, having openings and valves arranged as described, the whole being constructed and operating as set forth.

84,429.—SAD-IRON HEATER.—David H. Lowe, Boston, Mass.

I claim a sad-iron, heated substantially in the manner described by gas from naphtha.

84,430.—CULTIVATOR.—Thomas E. McDonald, New Brunswick, N. J., assignor to P. P. Runyon, Johnson Lester, and George J. Janeway, same place.

I claim, 1st, A machine, having a series of cultivator-teeth arranged on a rotatory shaft, in combination with a swinging or hinged frame, pivoted in rear of the cultivator, when the latter is operated by its progressing over and in contact with the ground, substantially as described.

2d, The employment, in combination with the cultivator, hinged frame, of the chains, or their equivalent, and a suitable moving and holding-mechanism for retaining the adjustable frame while the cultivator is at work, substantially as and for the purpose set forth.

3d, Arranging the teeth on each hub, or each set of teeth, spirally, as and for the purpose specified.

4th, Method, shown and described, of constructing and combining the teeth and their retaining-arms and hubs.

5th, A divided cultivator-shaft, whereby the machine is rendered capable of straddling a row of plants, and cultivating each side, as hereinbefore set forth.

84,431.—DISH-WASHER.—Charles Messenger, Cleveland, Ohio.

I claim the grate, I, radial angular arms, C, as arranged, in combination with the spindle, D, bow, G, and case, A, and operated in the manner as and for the purpose set forth.

84,432.—HARVESTER.—Lewis Miller, Akron, Ohio.

I claim, 1st, The combination of the changeable gears with the adjustable crank-wrist, so that a fast motion and short stroke, or a slow motion and a long stroke, may be given to the cutters, as the work to be done may require, substantially as described.

2d, Also the arrangement of the gear pinion, J, with regard to the pinion, k and rake-driving gear H, so that a long coupling may be used, and a change gear and change of speed attained or given to the rake, as and for the purpose described.

3d, Also in combination with the device by which the tongue may be made fast or loose, the double hook, 1 2, or its equivalent, by which the coupling bar may be suspended to the main frame, and to the lifting lever by the same or another chain, x, as and for the purpose described.

4th, Also in combination with a detachable platform, the rearward projecting arms, O P, on the main frame, for connecting said platform to, and carrying it upon, when the machine is being transported to or from the field or elsewhere, substantially as described.

5th, Also, hanging the rake and beaters or reel, and operating them upon or from two centres, remote from each other, and to which they are connected, so that the beaters shall have their rising and falling and horizontal position, without the use of guides, ways, or cam-ledges, substantially as described.

6th, Also, in combination with a combined rake and reel or beaters, having the motions herein described, the encased spring for raising the rake after it has cleared the platform, substantially as described.

84,433.—MACHINE FOR MAKING HARVESTER-GUARD FINGERS.—Lewis Miller, Akron, Ohio.

I claim, in combination with the rolls, B C, projecting beyond one of their housings, the pairs of changeable die-rollers, with their dies for rolling out irregular, shouldered pieces, F I, as and for the purpose set forth.

Also, in combination with a pair of rolls projecting beyond one of their housings, a pair of welding and shaping rolls and dies, and a pair of clamping and shaping tongs or holders, operating together to hold, weld, and shape a guard or finger, substantially as described.

84,434.—WINDLASS AND HORSE-POWER.—Simon B. Minnich, Landisville, Pa.

I claim, 1st, The construction of my hub or drum, C, with its lower flange and open chamber, Y, when the upper flange is provided with cog-like stops n, on its upper face, arranged and operated substantially in the manner and for the purpose specified.

2d, Independent rings, D M, provided with cog like stops, o, in combination with the drum, C, arranged in the manner and for the purpose set forth.

3d, The adjustable sliding hooks, L, on the radiating arms, K, in combination with the chambered hub or drum, C, when operated in the manner and for the purpose described.

4th, The arrangement of the sweep head, E, when provided with slots, 1 2

and S, for the reception of the rod, J, click bolt, I, and hook bolt, G, in the manner and for the purpose specified.
5th, A loose, wooden clock bolt, I, beveled and operating in combination with the cog-like steps, b, in the manner and for the purpose set forth.
6th, In combination with the hub or drum, C, radiating arms, K, and hooks L, the arrangement of the trunk, Q, with its vertical roller, S, and horizontal pulleys, t u r v, all arranged in the manner and for the purpose specified.

48,435.—HAND CORN PLANTER.—John H. Morris and Thos. B. Harrison, Maquoketa, Iowa. Antedated Nov. 18, 1868.
We claim, 1st, The seed box, A, of sheet metal, cast box, B, blocks, C' C'', springs, E E, plunger, D, in combination with the chamber or mortise, H, regulating slide, R, and brushes, T T, constructed, arranged, and operating as and for the purpose set forth.
2d, The seed box, A, in combination with the opening and glass sliding door, X, the strap, L, screws, M and N, and plunger, D, constructed, arranged, and operating as described.
3d, The combination of the stop block, O, plunger, D, blocks, C' C'', and seed box, A, constructed substantially as and for the purpose specified.

84,436.—ELEVATOR AND CONVEYER.—Lewis Y. Myers (assignor to himself and Emanuel Raner), Roanoke, Ind.
I claim the rail, A, conveyer frame, D, latch, b2, catch, b3, pulley, g, cord, h, weight, h', cord c1, pulley, d, and block and pulley, f, all combined, arranged, and operated substantially as set forth.

84,437.—CORN AND POTATO-PLOW.—Walter Notman, Deerfield, Ohio.
I claim the mold boards, G, of the twisted and bent form, as shown, combined and arranged with the V-shaped frame, A, cross pieces, B, uprights, D, and braces, C I, I, which parts are firmly secured to each other, as herein represented and described and for the purpose specified.

84,438.—PATTERNS FOR STOVES AND HOLLOW WARE.—John Owen (assignor to himself, Henry L. Brown, and A. Barr Irwin), Dayton, Ohio.
I claim patterns for casting stove plates and hollow ware made of paper, substantially as set forth.

84,439.—BEER-COOLER.—A. D. Puffer, Somerville, Mass.
I claim the arrangement of the cooler with respect to the movable drip plate, as and for the purposes specified.
Also, the opening, e, protected by the plate, f, as and for the specified purpose.
Also, a base draft waste constructed and arranged substantially as described.

84,440.—PRINTING-PRESS.—Leolf Reese and Harry Reese, (assignors to themselves and William McHenry), Philadelphia, Pa.
We claim, 1st, The box, A, having a recess in the top for the reception of type, and to which it is jointed by yielding hinges, a lid, F, containing a movable plate, H, faced with rubber, or its equivalent, and bearing on springs, I, all substantially as and for the purpose described.
2d, The arrangement of the springs, k, on the rods, h, between nuts on the latter and the projections, i, through which the rods slide, as and for the purpose specified.

84,441.—COMPOUND FOR TREATING PILES.—Martin Rinehart, Lockport, Ill.
I claim the medical compound, consisting of the ingredients substantially as herein descibed, as a remedy for the piles, as set forth.

84,442.—CONSTRUCTION OF WASTE-WATER PIPES.—Adam C. Smith, Philadelphia, Pa.
I claim a water pipe, consisting of a strip of metal coiled spirally, and so that one edge shall overlap the other, as set forth.

84,443.—CURTAIN FIXTURE.—Lewis Smith and Samuel Foster, Jr., Des Moines, Iowa.
We claim in combination with the roller, D, and its reel, F, the elongated journal, a, provided with an indentation, i, within which the bend in the curved spring rod, 1, is rested, all as herein shown and described.

84,444.—LOW WATER AND HIGH STEAM INDICATOR.—L. F. Smith, Philadelphia, Pa.
I claim, 1st, The combination of the cylinder, A, tube, B, and cylinder, E, the latter provided with openings, a a, and suspended, by means of levers, G H, and rods b c d, from the valves, J, of the steam whistle, D, all substantially as herein set forth.
2d, In combination with the valve, e, the circular cap, f, fitting in the groove, i, on the valve seat, b, substantially as herein set forth.
3d, The arrangement of the levers, U W, weight, T, and rod, V, as set forth.
4th, The arrangement of the cylinder, A, and the inner vessel, E, with its perforations, a a, with the steam generator, C, and whistle, D, all substantially as specified.

84,445.—CASE FOR PRESERVING FLOWERS, ETC.—E. M. Stigale, Philadelphia, Pa.
I claim the rubber band, e, applied to the edge of the glass, fitting a recess in the base, and protected by a flange, i, on the glass all as set forth.

84,446.—CARRIAGE SPRING.—William F. Vernier, Philadelphia, Pa.
I claim, 1st, In combination with the axle and frame of a carriage, the lever, D, having its fulcrum at a, and the gum-elastic spring, G.
2d, In combination with the above, the cross levers, D', with their gum-elastic springs, arranged substantially as and for the purpose set forth.

84,447.—PNEUMATIC STREET RAILWAY CAR.—C. W. Wailey (assignor to New Orleans Pneumatic Propelling Company), New Orleans La.
I claim the combination of a street railroad car with a pneumatic engine, when the latter is operated by compressed air, that is contained in tanks composed of paper or its equivelent, and which are carried on the car, substantially as herein described for the purpose set forth.

84,448.—CURTAIN CLASP.—B. F. Watson and Albert Shepard, Bridgeport, Ill.
We claim the metallic band, a, open at the top, forming small rolls, C C, from which project the handles, c c, for operating it, all as herein shown and described.

84,449—CULTIVATOR.—Seth Way, La Porte, Ind.
I claim, 1st, the swiveling joint, 2 8, secured to the tongue of the carriage, substantially as and for the purpose described.
2d, The construction of the lever, 1, and its combination with the plow beams, substantially as shown and described.
3d, The arrangement of the stirrups, 4, with reference to the two diverging portions of the plow beams, substantially as and for the purpose described.
4th, The socket, 3, and its combination with the axle 7, and tongue, A, substantially as shown and described.

84,450.—SAFETY HORSE HITCH.—Theophilus Weaver, Harrisburg, Pa. Antedated September 22, 1868.
I claim, 1st, The base, R R', substantially as herein set forth.
2d, The holder, F, with tread, h l, and bars, s t u, substantially as shown and described.
3d, The arrangement of the base, R R', and holder, F, for the purposes specified.
4th, Inserting a hitching strap, plicated to form a release hitch, substantially in the manner herein set forth.

84,451.—MECHANICAL MOVEMENT.—Milo Webb, Chenango Forks, N. Y.
I claim the arrangement of the frame, A, with the cylinder, C, chain, D, cylinder, E, spring, H, wheels, F, I, shaft, G, dogs, o o, bar, h, shaft, i, spring, m, regulator, R, and its screw, S, wheel, N, bar, L, and rod, O, all, with their various parts, constructed and operating substantially as herein set forth.

84,452.—DUNG DRAG AND HOOK.—Henry W. Weiss, Quakertown, Pa.
I claim the improved dung drag, consisting of the rolling bar, D, with teeth, a, and standard, E, the pivoted stop bar, F, lever, G, guard, d, frame, A B B', C C', and swivelled roller, H f, all constructed and arranged to operate substantially as herein described.

84,453.—COVER FOR HAY AND GRAIN COCKS.—E. R. Whitney, Plattsburg, N. Y.
I claim as a new article of manufacture, the herein-described cover for grain and hay stacks and cocks, when the same is constructed of water proof paper, and provided with holes for the guys, substantially as and for the purposes herein set forth.

84,454.—HEMMER FOR SEWING MACHINE.—Elihu Wilder, and John Crandell, Chicopee, Mass.
We claim, 1st, A hemming attachment for sewing machines, composed of the stationary plate, B, and the slotted sliding plate, A, having the curved surfaces, b and c', for forming the folds, substantially as described, and the whole constituting an adjustable hemmer, as set forth.
2d, The movable plate, A, of an adjustable hemmer, having thereon lips, b c', and the elongated loop, a, constructed and applied substantially as set forth.
3d, The slotted and jointed guide, G G', in combination with a hemming attachment for sewing machines, and constructed substantially as set forth.

84,455.—MANUFACTURE OF ALCOHOLIC SPIRITS FROM TOMATOES.—Joseph S. Williams, Cinnaminson, N. J.
I claim the process, herein described, of producing spirits, by first separating the juice of tomatoes from the pulp, then mixing molasses, or other saccharine matter, and yeast, and afterwards fermenting and distilling the compound liquid thus obtained.

84,456.—COFFEE POT.—William M. Williams, St. Louis, Mo.
I claim the vessel, A, with tubes, a', strainer, B, and condenser lid, C, the strainer being located centrally in regard to the tubes, and the whole being combined and arranged as and for the purpose set forth.

84,457.—UMBRELLA.—George L. Witsil, Philadelphia, Pa.
I claim an elastic tip, in combination with the handle of an umbrella or cane, substantially as shown and described.

84,458.—CONSTRUCTION OF ICE PITCHERS.—Wm. C Wood, Washington, D. C.
I claim, 1st, A self-operating vent valve, substantially as shown and described, for the purpose specified.
2d, A self-operating bolt, arranged and operating substantially as described, for the purpose specified.
3d, The combination of a self-operating vent valve, and sliding bolt or latch, arranged, and operating substantially as described, for the purposes specified.

84,459.—BREECH-LOADING FIRE-ARM.—Andrew Wyley, Birmingham, England. Patented in England, March 25, 1867.
I claim the combination of a longitudinal plunger with a locking bolt of T-form, which, when raised, acts as a handle for manipulating the said plunger, while performing its various functions of ramming and drawing the cartridge (where the cartridge requires to be drawn), and of cocking the lock, the whole constructed and operating substantially as herein set forth.

84,460.—GAS MACHINE.—E. Hall Covel and William H. Covel, New York city.
We claim, 1st, Mixing atmospheric air and any of the inflammable gases, and then adding to the mixture certain further proportions of the gas, before passing the same over or through the carbon supplying materials.
2d, Mixing atmospheric air and any of the inflammable gases, and then adding to the mixture certain further proportions of the gas, after the said mixture has been passed over or through the carbon supplying materials.
3d, Pumps, A and B, in combination with an enclosed space or carbonizer, I, fluid or chemical tank, L, and feed pipe or opening, N, or their equivalents, when used to add new constituents to the mixture of air and gas produced by the action of pumps, A and B, and to keep up the supply of such new constituents.
4th, Pump, A, pump, B, tank, L, feed pipe, N, ventilating pipe or pipes, O, and enclosed space, I, or their equivalents, with the usual couplings and connections known in the business, when combined for the purpose of mixing air and gas, supplying new constituents to such mixture, and keeping up, automatically, the supply of such new constituents.
5th, The combination of filling pipe, M, feed pipe, N, ventilating pipe or pipes, O, and tank, L, with inclosed space, I, constructed and operating substantially as and for the purpose hereinbefore described.
6th, Pump, A, pipe, E, and carbonizer or inclosed space, I, or their equivalents, in combination with a lamp or any other heating device, operating substantially as and for the purpose described.
7th, The pumps, A and B, in case, C, tank, L, and an inclosed space or carbonizer, as arranged.
8th, Pump, A, pump, B, pipe, H, and an inclosed space or carbonizer, combined with a regulator, valve, cock, or other device for checking or regulating pressure, or their equivalents, operating substantially as and for the purpose hereinbefore described.
9th, Pump, A, and pipe, E, or their equivalents, combined with a regulator, valve, cock, or other device placed in upon pipe, E, when so constructed that, either automatically or otherwise, pipe, E, shall or may be closed when the pump, A, is not in action, for the purposes hereinbefore described.
10th, Pump, A, and pipe, e, or their equivalents, and lamp, W, or other heating device, combined with a regulator, valve, cock, or other closing device, placed in or upon pipe, E, when so constructed that, either automatically or otherwise, pipe, E, shall or may be closed, when the pump, A, is not in action, and the hot air generated by the heating device, W, or its equivalent, instead of passing up pipe, E, shall be forced to discharge itself into the air.
11th, Pump, A, and pipe, E, or their equivalents, in combination with a heating device, operating substantially as and for the purpose hereinbefore set forth.
12th, Gas service pipe, X, pump, A, pump, B, pipe, D, and their equivalents, in combination with a regulator, valve, cock, or other device for checking or regulating pressure, and space, G, for the purpose of adding a further supply of gas to that already furnished by pump, B, and controlling proportions of gas and air in space, G.
13th, Gas service pipe, X, having in or upon it a regulator, valve, cock, or other device for checking or regulating pressure, in combination with pipe, H, and carbonizer or inclosed space, I, for the purpose of controlling proportions of gas and air caused to enter the inclosed space or carbonizer, I.
14th, The combination of gas service pipe, D, gas supply pipe, K, and cross pipe, R, having in or upon it a regulator, cock, valve, or other device for checking or controlling pressure, or their equivalents, when substantially constructed and arranged as described, and for the purpose set forth.
15th, Forming channels, and bisecting the same, within the carbonizer or incloser space, I, by means of partitions and sheets of porous substance, when constructed and arranged substantially as shown and described, and for the purpose set forth.
16th, The combination of the pumps, A and B, pipe, H, tank, L, pipe, N, pipe, O, heating device, W, pipe, E, and a carbonizer or inclosed space, or their equivalents, when arranged to substantially operate in the manner and for the purpose hereinbefore described and set forth.
17th, The improvement in combination gas machines, constructed and operating substantially as hereinbefore described and set forth.

84,461.—TOY TARGET.—G. F. Fessenden, Arlington, Mass.
I claim a toy target constructed to operate substantially as described.

84,462.—HORSESHOE.—Wm. C. Whitmore, Macon City, Mo., assignor to Abijah Richardson, Boston, Mass.
I claim, 1st, My improved horseshoe, constructed with the single continuous rib, c, one or more bevels or inclined inner faces, d e, a continuous groove, b, and nail holes, a, arranged as described, the rib, c, under such arrangement, being made to project down below the groove, b, or the part in which such groove is made, the whole being substantially as specified.
2d, Further, a horseshoe having a continuous groove in which are the nail holes, and surrounding a single continuous rib or calk, when constructed in the manner substantially as described.

REISSUES.

70,447.—BLAST FURNACE.—Dated Nov. 5, 1867; reissue 3,204.—George Asmus, New York city, assignee of F. W. Lürmann.
I claim, 1st, A blast furnace with a closed breast where the slag is discharged through an opening or openings cooled by water, substantially as set forth.
2d, The slag discharge piece or cinder block D, constructed and arranged substantially as described.
3d, The cinder-block D in combination with the plate C, to which it is attached, substantially as described.
4th The shape of the discharge-opening or openings of the cinder block D, being made flaring at its ends, and of diminished diameter in the middle or central part, substantially as described.
5th, The combining of the slag discharge piece or cinder block with a series of water channels or pipes, substantially as and for the purpose above set forth.
6th, Combining with the metallic plate C, a series of water channels or pipes, substantially as and for the purpose set forth.
7th, The method of controlling the discharge of slag from blast furnaces by regulating the temperature of the slag-discharge piece or cinder block, substantially as described.

82,082.—CARRIAGE SPRING.—Dated September 15, 1868; reissue 3,205—Azro Buzzell, West Fairlee, Vt.
I claim my improved arrangement of the three springs, A, B, C, as described, without any connection, extending from or about from the middle of one spring, B, to or about to that of the spring C, the whole being as shown in the drawings.

48,495.—GRAIN ELEVATOR.—Dated June 27, 1865; antedated June 12, 1865; reissue 3,206—Lewis S. Chichester, George H. Nichols, and Clark W. Mills, Brooklyn, N. Y., assignees, by mesne assignments, of Francis Taggart, Lewis S. Chichester, and Clark W. Mills.
We claim, 1st, A floating elevator, formed by two vessels or floats, connected together, and leaving a space for a boat or barge, in combination with an elevating apparatus.
2d, An elevator, d, fitted to be raised or lowered, in combination with the floats, a a, and platform connecting said floats and supporting the elevator, substantially as set forth.
3d, A grain elevator fitted upon a float, and arranged so that the axis of the elevator drum is at right angles, or nearly so, to the float, in order that the elevator may act longitudinally of the vessel to be discharged, substantially as specified.

79,553—VELOCIPEDE.—Dated July 7, 1868; reissue 3,207—Benjamin P. Crandall, New York, N. Y.
I claim, 1st, The combination, with the operating lever J, of a tubular support, K K, and the indepenpent screw L, substantially as described.
2d, As an improvement in the mode of operating the steering apparatus of velocipedes, the pivoted rods E, in combination with the yoke, F, and the steering wheels D, substantially as described.
3d, As a new article of manufacture, the detachable cast metallic plates, N, when applied to the spokes of the wheels, for the purpose described.
4th, As an improvement in the patent granted to Crandall & Conover, dated April 2, 1861, the connecting rods, M, bent at both ends, in combination with the wheels, B, substantially as described.

79,674.—WOODEN PAVEMENT.—Dated July 7, 1868; reissue 3,208—Duncan McKenzie, Brooklyn, N. Y.
I claim the wooden pavement, constructed, as described, of the blocks A, secured together by means of the beveled strips attached to the opposite sides of said blocks, so as to form either a single or double dovetail or lock, substantially as herein set forth.

76,510.—MACHINE FOR THE MANUFACTURE OF GUNPOWDER.—Dated April 7, 1868; reissue 3,209—Paul A. Oliver, New York city.
I claim, in the manufacture of gunpowder, the employment of one or more pairs of rollers, substantially as herein described.
Also, the combination with the said rollers of a pair of toothed rollers, substantially as herein described.
Also, as an improved article of manufacture, a machine for making gunpowder, consisting of a series of rollers, operating substantially as described, so as to deliver the ingredients from one pair of rollers to the next pair, and so on as herein set forth.

21,034.—SEED PLANTER.—Dated July 27, 1858; reissue 3,210—J. H. Thomas and P. P. Mast, Springfield, Ohio.
We claim, 1st, The combination of a grass-seed sower with a grain seeder, in such a manner as to distribute the grass seed behind the tubes or hoes of the grain seeder, substantially as described.
2d, The combination of the grain hopper, G, and the grass-seed hopper, H, when constructed and arranged to operate substantially as and for the purpose set forth.
3d, The combined hoppers, G and H, having their ends, at each side of the machine, formed of a single plate, substantially as and for the purposes herein described.

30,045.—BREECH-LOADING CANNON.—Dated September 18, 1860; reissue 3,211.—Charles F. Brown, Warren, R. I.
I claim, 1st, Exploding the cartridge of a breech-loading firearm by means of a reciprocating plunger held within the hollow breech pin, said plunger being detained by means of a lever, released by means of a cam actuating said lever, and forced forward by means of a spring held in the breech pin, substantially as set forth.
2d, Locating and exploding a cartridge in a breech loading firearm by the action of one rotating shaft, I, and by means of an eccentric, K, and cam, u, mounted on said shaft, substantially as specified, the shaft being arranged transversely through the body of the gun, as set forth.
3d, The arrangement and combination with each other of the barrel, A, breech pin, B, plunger, C, spring, t, lever, L, cam, u, eccentric, K, and shaft, I, all made and operating substantially as herein shown and described.
4th, The wheel, J, applied in combination with the eccentric, K, or its equivalent, for the purpose of producing the rotation of said eccentric to effect the firing of the ordnance during the motion of the gun carriage, as specified.

64,663.—FLOAT VALVE.—Dated May 14, 1867; reissue 3,212.—J. H. Guild, Rupert, Vt.
I claim, 1st, The arrangement of the fulcrum of the clamping lever, e, in such manner as that, on disconnecting the float from gear with said lever, the latter drops, to effect closure of the tube, substantially as shown and described.
2d, The arrangement, in the perforated vessel, A, of the float, B, having the perforated or notched vertical rod, b, engaging with the pivoted oscillating lever, e, connected by the link, d, to the lever, e, pivoted to the opposite side of the vessel in such a manner that, as the float, B, is elevated by the water, the projection, f, upon said lever, e, presses against the elastic pipe, C, effectually closing the same, substantially as described, and for the purpose specified.

30,010.—HORSE RAKE.—Dated September 11, 1860; reissue 3,213—Daniel Strock, Chambersburg, Pa.
I claim, 1st, The combination of the rake head and straining frame, when arranged and operating substantially as described for the purpose set forth.
2d, The employment of the rubber or other suitable springs, L, adjustable rods, l, tightening nuts, H, straps, I2, and quadrant levers, I, for holding the rake teeth and regulating their tension, substantially as and for the purpose described.
2d, The combination, with the rake head, G, and the rake teeth, of the quadrant levers, I substantially as and for the purpose described.

12,233.—SEWING MACHINE.—Dated January 16, 1855; reissue 3,214.—Jotham S. Conant, Hackensack, N. J., assignee, by mesne assignments, of himself.
I claim an endless rotary cloth feeder, substantially such as herein described, in combination with a reciprocating eye pointed piercing needle.

22,990.—MOP HEAD.—Dated February 15, 1859; reissue 3,192, dated November 10, 1868; reissue 3,215.—Luke Taylor, Springfield, Vt.
I claim, 1st, In a mop head in which the cross head or stationary jaw is attached permanently and immovably to the handle operating the movable jaw or binder by means of a tubular screw or socket fitted on the handle, and having its screw thread on its exterior, in combination with a nut encompassing the screw, and connected with the movable jaw, so as to operate substantially in the manner as shown or described.
2d, Operating the movable jaw by means of the loose screw collar, C, revolving between the nut, D, and the handle, A, substantially as described.

DESIGNS.

3,263.—CHAIR SEAT BOW.—Henry C. Knowlton, Gardner, Mass.

3,264.—TRADE MARK—B. B. Wilcox, New Haven, assignor to J. W. Nash, Madison, Conn.

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U. S. Patent Office,
Washington, D. C., Nov. 19, 1868.

Thomas C. Ball, of Bellows Falls, Vt., having petitioned for an extension of the patent granted to him on the 27th day of February, 1855, for an improvement in "Screw Jacks;" it is ordered that said petition be heard at this office on the 8th day of February 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., Nov. 23, 1868.

Chas. Cunningham, of Nashua, N. H., having petitioned for an extension of the patent granted him on the 13th day of March, 1855, for an improvement in "Benzole Vapor Apparatus," it is ordered that said petition be heard at this office on the 15th day of February 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.

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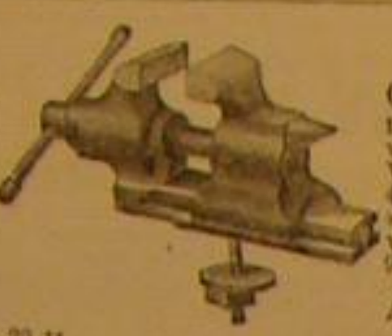

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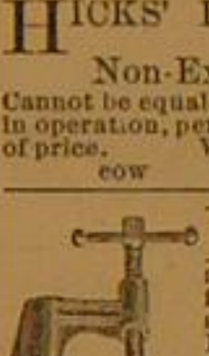

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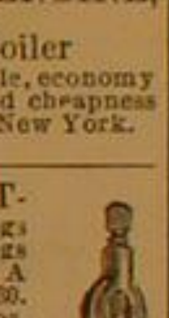

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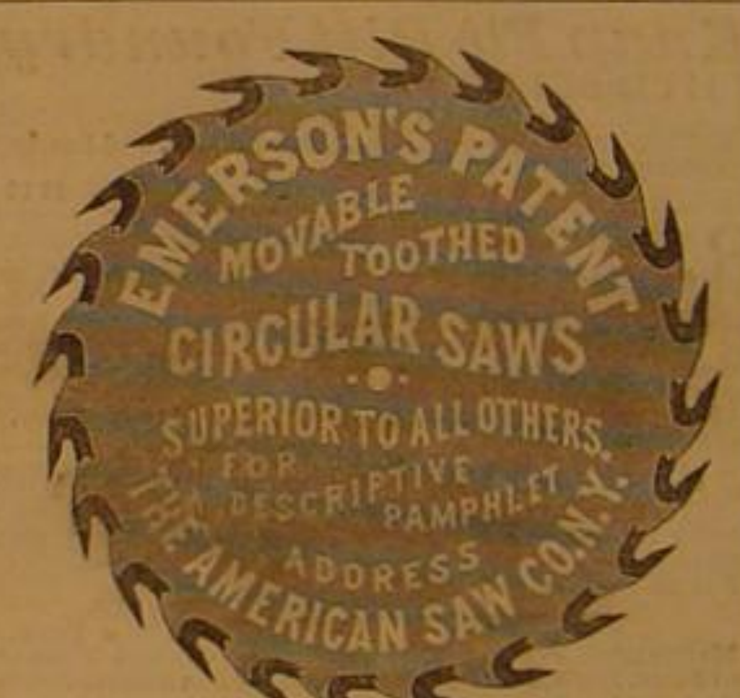

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