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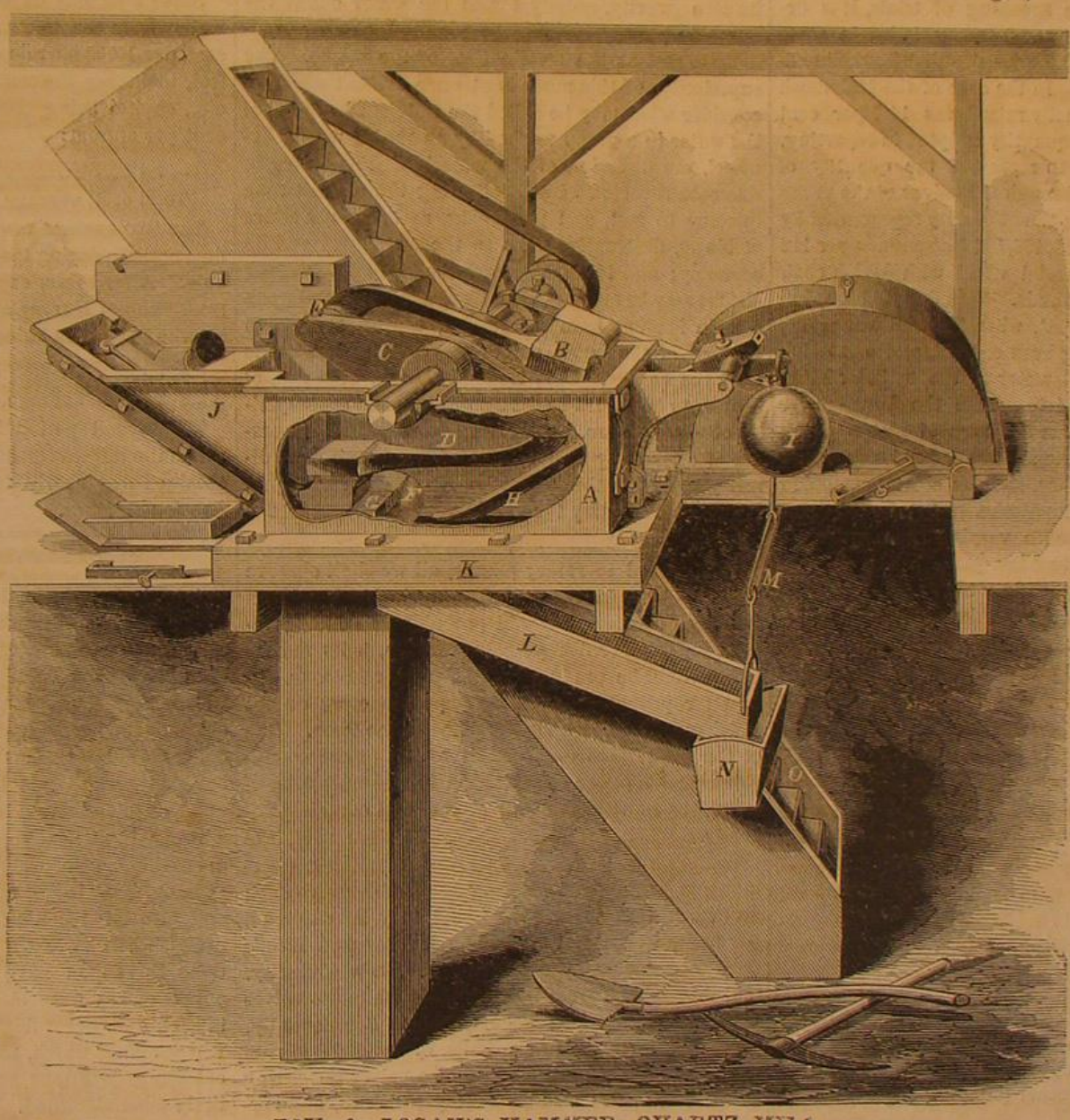
Improved Quartz Mill.

The great amount of capital invested in mining interests at the present time is encouraging to inventors, for the rivalry among the different companies causes a desire to reduce the working expenses by introducing machinery wherever practicable. This opens a field to practical men for enterprise and investigation which many are now working with profit.

The engraving published herewith represents a quartz mill which is entirely original in design and conception. The crushers consist of hammers struck upon an anvil in a manner similar to that performed by hand, and the blow thus given is claimed to be effective both in its percussive force and the subsequent abrasion or grinding produced by withdrawing the hammer or dragging it across the face of the die as it leaves for another stroke.



RIX & LOGAN'S HAMMER QUARTZ MILL.

In the engraving the case, A, constitutes the frame of the machine, and the hammers, B, are fastened to the revolving arm, C, by helves, D, which are jointed, as at E, to afford the proper movement; and there are certain stops, not shown, which the hammer rests upon when in the act of revolution. The anvil, F, on which the hammers strike, is a solid wrought or chilled iron block, proportioned to the weight of the hammer. In this anvil is fitted the die, G, which is held in place by side flanges, and is kept from being drawn backward by a rod; the anvil around the die is made convex, or cupped out, so as to form a hopper. The tendency of the hammers to fly outward when revolving, is restrained by a guard, H, which is merely a lever connected with a weight, I, on the short arm, so that the centrifugal force is thus balanced by any weight which may be found necessary to put on the short arm. In using this system for forging iron a different method of forming the guide is employed.

A machine used by the inventor, built on what he terms "a governing circle of 30 inches," is run at about 40 revolutions per minute. The ore, in the same state as it is used in the ordinary stamps, is fed in at the hopper, J, from thence it runs down to the dies, on to which it is pushed by a feeder which works up and down in the spout of the hopper, J. This feeder is arranged to make a deposit between the blows of the hammer. The ore crushed by the hammers is drawn off into the box, K, in the bottom of the case, A, from whence it drops on to sieves, L, which are of different mesh. The sieves also receive a shaking movement through the rods, M. All the ore not fine enough to go through the smallest sieve, falls through a side spout, N, into the elevators, O, by which it is raised to the hammers again.

In their circular the manufacturers say:—"This machine is now complete and ready for sale. In constructing it, our aim has been to produce a light, cheap and economical crusher—one adapted to mining on a small as well as on a large scale. The elementary principle on which it operates is that of the stamp—the only one really reliable and economical. But the stamp has many serious disadvantages, among which are its great weight and small velocity; the great power required to run it; difficulty in feeding properly; imperfect discharge, and the necessity of crushing wet, or the annoyance from dust in crushing dry. All these difficulties are obviated in our machine, and the percussive blow of the stamp retained, with the further advantage of its being a drawing or grinding one. We give to our hammers such absolute or relative weight and velocity as we choose, just such as to effect their purpose and no more, thus securing the qualities of the natural hammer blow. The feed is self-adjusting and uniform, and as fast as the ore reaches the required degree of fineness (which depends upon the fineness of the screen or sieve used) it is instantly discharged, so that there is no packing of the ore under the hammers. The mill crushes dry, with no more dust than that incident to feeding, which is trifling. As the only support of the mortar is a single post set into the ground, the machine can be put in place at slight expense. The size now being built weighs about 1,800 pounds, complete; the heaviest piece not weighing over 275 pounds. It is driven by half-a-horse power, and crushes from three to ten tuns per day of twenty-four hours, according to the character of the rock and the fineness to which it is reduced. Price $800. Larger ones will be furnished if desired. We invite an inspection of the mill now in operation adjoining the foundery of Devoe, Dinsmore & Co., on Fremont street, between Market and Mission streets, Cal. For further information apply to or address Rix & Logan, No. 11 Court Block, San Francisco, Cal. Patent applied for.

Origin of Soap.

The application of soap as a detergent is not of high antiquity. Like other usual things, electric communication for instance, it seems to have been known, as a fact, for a considerable time before it was turned to its most serviceable account. At first soap was merely a cosmetic for smoothing the hair and brightening the complexion. When once its valuable detersive powers were discovered—doubtless by accident—its employment spread rapidly. Numerous soap manufactories sprang up in Italy, notable in the little seaport town of Savona, near Genoa, whence the French name of soap, *savon*. Its manufacture spread in Spain and France. Marseilles became famous for its marbled soaps. Our word soap may come from the Latin *sapo*, which is mentioned by Pliny as an invention of the Gauls. As woolen garments preceded linen, so the fuller's art (for cleansing, scouring and pressing cloths and stuffs) is older than the washerwoman's, being due, it appears, to one Nicias, the son of Hermias. His grand discovery would be the employment of an earth, since named after the persons who used it. The Roman fullers, who washed dirty togas, were persons of no little importance. Their trade, and the manner of carrying it on, were regulated by laws such as the *Lex Metalla de fullonibus*.

At one time, fuller's earth (found of a very superior quality in Staffordshire, Bedfordshire, and other English counties) was considered so indispensable for the dressing of cloth, that, to prevent foreigners from rivaling English fabrics, it was made a contraband commodity, and its exportation made equally criminal with the heinous and wicked export of wool. How completely public opinion has changed! No weathercock could make a more perfect gyration from north to south, from east to west. What is it criminal to export now? Convicts and contraband of war, perhaps, but certainly not harmless earth and wool.

THE ECONOMY OF PUMPING ENGINES.

The economy of the Cornish engine is, doubtless, due to two peculiarities; first, the high degree of expansion employed; and, second, the mode of applying the dynamic force of steam to propel the water. The advantages of applying expansively, so well known to engineers generally, appear to have been early appreciated by the Cornishmen, whether accidentally or by scientific research, as far as we are concerned, it matters not; but these are available to a greater extent at the opening of a mine than afterward, as an engine of greater power than at first requisite will usually be erected, and, of course, the steam can then be cut off very early in the stroke; but as the works extend, and more water flows to the pump well, more steam is needed, and, consequently, so high a degree of expansion as was commenced with is not maintained.

The experiments tried on the Cornish engine at the East London Water Works, showed the following effects:—When there was no expansion, the duty done is taken as 100; it was when the steam expanded through 0·307 of the stroke, 162·6, and when through 0·687 of the stroke, 224. While speaking of trials, it is desirable to refer to a source of error existing in some of the reports of duty in Cornwall—that is, the inefficiency of pump valves. In the case of the Holmbush engine, the water actually raised was 14·7 per cent less than the calculated quantity adopted in reporting, and this loss appears to represent the quantity of water which ran back through the valves of the pump while they were closing; thus the duty represented by the steam power was 231,486,182 foot-pounds per 112 lbs. of coal, and the useful effect with Welsh coal, only 122,376,128 foot-pounds. This duty is high, but it must be mentioned that, when the trial was made, the engine had not long been erected, and was doing but light work—the diameter of the cylinder being 50 in., and stroke 9 ft. 1 in., while the horse-power was but 26·5 horses; thus the area of piston being 1,963·5 square inches, the allowance per horse-power would be 74 square inches, and the steam expanded through 0·83 of the entire stroke, or nearly five times its initial bulk, its pressure varying from 24·98 lbs. per square inch, down to 4 lbs. per square inch.

In comparison with the duty above mentioned of the Holmbush engine, we may take some of those reported in Cornwall for September, 1864. The following list comprises those out of thirty-four which exceeded the average duty of 49,800,000 foot-pounds per 112 lbs. of coal:—

	Millions.
Boscawen, 70 in	52·2
Chiverton, Cookney's 60 in	57·0
Cargoll Mines, Michell's 72 in	58·6
Carn Brea, 76 in	50·0
Cook's Kitchen, 50 in	53·9
Crane, 70 in	64·5
Great Wheel Busy, Harvy's 85 in	63·2
Great Work, Leed's 60 in	60·3
North Wheal Crofty, Trevenson's 80 in	52 0
South Wheal Frances, Marriot's 75 in	55·9
West Caradon, Elliot's 50 in	70·8
West Wheal Seton, Harvy's 85 in	56·1
Wheal Ludcott, Wilcock's 50 in	53·0
Wheal Margery, Wesley's 45 in	55·6
Wheal Seton, Tilly's 70 in	59·6
Wheal Tremayne, Michell's 60 in	53·7

To this list we will append the duties attained at various times by some other pumping engines:—

	Millions.
East London W. W., 80 in. Cornish	97·1
East London W. W., 60 in. Boulton	47·7
East London W. W., 80 in. C., highest duty.	103·0
East London W. W., 90 in. Wicksteed	81·8
East London W. W., 90 in. with Welsh coal.	109·0

It should be here noted that the highest duties of the Cornish and Wicksteed engines are calculated for Welsh coal, from its relative evaporative value to that used at the East London Water Works:—

	Millions.
West's engine, 1 year's average	83·5
Taylor's engine, 8 years' average	93·1

It is usually supposed that small engines are not so economical as large, but there are now some near London doing a duty of about 80,000,000 of foot-pounds per 112 lbs. of coal.

We will now proceed to consider the second advantage of the Cornish engine, namely, the mode of applying the dynamic force derived from the steam in the cylinder.

The steam acts in raising a weight and drawing water from the well into the pump barrel, this latter item being small in proportion to the former; then, the pressure being equalized on both sides of the piston, the weight which had been lifted falls, forcing the water through the outlet valve from the pump barrel, and drawing up the steam piston ready for another stroke. From Mr. Wicksteed's experiments on the 80-inch Cornish engine we quote the following particulars, to show the distribution of the steam power, averaging during the stroke those quantities which vary:—Preponderating weight, 55,401 lbs. or 11·037 lbs. per square inch of piston; water raised by engine, 4,125 lbs., or 0·821 lbs. per square inch; cold water pump, 186 lbs., or 0·037 lbs. per square inch; hot water pump, 6 lbs.; air pump, 591 lbs., or 0·117 lbs. per square inch; friction 1,009, lbs., or 0,200 lbs. per square inch; imperfect vacuum, 3,664 lbs. per square inch; total 64,982 lbs., or 12·94 lbs. per square inch steam pressure on the piston.

Now, the effect of the steam in raising the preponderating weight is evidently produced most conveniently, for if, at the commencement of the stroke termed the indoor or steam stroke, the engine runs a little fast, no shock occurs, but the extra momentum is quietly absorbed by a slight increase of speed, upward, of the weight being raised. Then when the outdoor stroke begins, the preponderating weight, by its own gravity, quietly forces the water out of the pump to wherever it may be required, coming gradually to rest at the termination of the stroke. The superiority of this mode is at once evident when we consider what may be called the riotous movement of the water in a pump worked by an engine with a fly-wheel, the direction of the water's motion being in this case reversed without allowing the current time to come to rest, and producing, as it were, a series of blows, destructive alike to the machinery and its economy; and to any observer the effect of hydraulic shocks may be made evident by placing the hand upon a main leading from a pumping engine, as thereon the beat of the pump valves may be felt even a mile from the engine. This transmission of blows is, of course, to be traced to the comparative inelastic quality of water. Then, again, the gradually failing pressure of expanding steam is not favorable, if it be directly applied to the propulsion of water, which liquid cannot so well carry the varying effect without loss of power.

With regard to rotary pumps, all we shall observe is this:—A *perfect* rotary pump, worked by a uniform moment of pressure, would probably be an improvement on the Cornish pumping engine, if its motive power could be produced as cheaply, otherwise, except for purposes of trifling importance, we do not feel disposed to place much reliance upon them. One of the most important details of the pumping machinery rests in the valves, upon the construction of which the smooth working of the engine mainly depends. When the old clack valves were used, the vibration due to their closing was something enormous, in some cases shaking the buildings to such an extent that the engine could only be worked a few hours at a time; but when Harvey and West's double beat valves were introduced, this difficulty, and that arising from loss of water while the valves were closing, were at once obviated; subsequently, valves closed by numerous balls, or small india-rubber flaps were introduced, and also valves consisting of cylinders perforated on their peripheries, and surrounded by india-rubber straps, were applied; as also a variety of other contrivances, most of them ingenious and some useful. The double beat valves may occasionally be fouled, as once happened at the Ajax engine at the East London Water Works, when an eel came up the wind bore of the pump, but such cases are exceedingly rare. Recently, surface condensers have been applied to Cornish engines, both at the Scarborough and Kent Water Works, and certainly this description of steam machinery appears to afford them great facilities for working satisfactorily, as all the water passing to the main pump may, if it be desired, be allowed to flow through the condenser, thus insuring a good vacuum.

In entering upon the next branch of our subject, the question of finance, great caution is needed, as the means of obtaining correct information are very scarce, and, when found, give data rather perplexing to generalize, especially for comparison with those relating to double-acting engines. The figures, which will be quoted, are taken from actual practice, not mere estimates. In the first place, it will be necessary to come to some conclusion as to criteria of horse-power of Cornish engines, as usually worked. For this purpose various particulars have been gathered which tend to show that, taking a wide range of practice, there is, on the average, an allowance of about thirty square inches of piston surface per horse-power, and this does not appear unreasonable, as it corresponds to fifteen square inches per horse-power in a double-acting engine—the mean velocity of the piston on both strokes, and including stoppages at the end of each stroke, may be taken for an engine working regularly, as being about one hundred feet per minute, but in different engines the speed varies very considerably. Taking the allowance of thirty square inches per horse-power as granted, the mean cost of bright Cornish engines will be found to amoun to about fifty-four pounds per horse-power, exclusive of boilers. This appears very heavy, but it applies to engines of average dimensions, and includes the pump work and duplicates of the valves; and of this amount the main pump work costs about twenty-five per cent, or about £14 10s. per horse-power, leaving, for the price of the engine proper, about £39 10s., or nearly four times as much as an ordinary horizontal engine would cost.

Some idea may be formed as to the cost of raising water, from the following statistics, which give the cost per 1,000 barrels of 36 gallons each, raised 100 feet, including the entire works, engines, buildings etc., capital being taken at the interest of five per cent per annum:—

	Pence.
Total cost, average, of nine years	18·114
Total cost, average, of five years	21·336

The two engines worked day and night during the first period; during the second, one worked in the day only. After these, engines were improved by the introduction of Harvey and West's valves, and by coating the boilers and steam pipes more effectually.

	Pence.
Total cost, average, of nine years	20·452
Total cost, average, of five years	16·437

The second period being, of course, that during which the improvements were in use, the saving thus obtained was nearly twenty per cent per annum.—*London Artizan.*

THE EDUCATION OF ENGINEERS.

A perfect engineer, if such an one could be found, would be a man of gigantic intellect and vast research, a thorough master of all the sciences, and an unerring observer of all natural phenomena, and, withal, gifted with a wondrous power of classification, whereby to order to the best advantage the cornucopia of precedents stored in his memory. Being unable to bring our engineers to this Utopian condition, it devolves upon us to endeavor to ascertain the best mode of approaching it, each generation adding to the general development of the professional body. In the beginning, knowledge must be generated in the mind, and tutorial teaching only becomes necessary, or useful, when a great number of facts and generalizations thereupon have accumulated; hence the pioneers of any new science or art are of necessity self-taught, and, accordingly, liable to many errors, notwithstanding which, they are usually idolized by succeeding generations, and very often, in character, entirely misunderstood. From such causes, some of the most grotesque conceptions arise, one of which may be recognized in the conventional "practical man" of the last generation, which individual was rather identified by his grimy aspect than by his mental qualifications. Telford, who may reasonably be termed the father of modern civil engineering, has been said to have despised mathematicians in the profession; but an examination of his works and reports proves most incontestibly that he was himself a very sound practical mathematician.

There has, however, been good ground for objecting to the complication which some mathematical authors seem to delight in introducing into their practical (!) treatises on the various branches of constructive science, preferring the elegant method of the infinitesimal calculus to the simpler one of plebian arithmetic. To mention an instance, continuous girders were treated theoretically thus until 1861, though, in some instances, the authors were fearfully at fault, probably from omitting those constants which they are incapable of determining, or otherwise liking to be rather original, and, therefore, slightly altering theorems borrowed from the works of their cotemporaries.

Any one who has the necessary funds to pay a premium can enter the engineering profession, and experience shows that many do it, or have themselves so placed by their friends, because they must do something and like to be professional men nominally without the trouble and anxiety of undergoing a period of probation, occupied with unceasing attention to study and the practical departments of an active business life. The result is that they often come through their pupilage scarcely more informed than they were at entering it, their future depending upon their own private means and influences, which, not being available to all, those who lack them must degenerate into the lowest class of mechanical draughtsmen. This arises from the fact that in most engineers' offices pupils learn just what they choose to pick up, there being no instructions, as it were, forced upon them, nor even a present reward offered to such as become most competent, and at the age at which youths usually enter the profession, there are but few who energetically pursue it from a clear conception of their own interests, and two or three years then lost cannot be afterward redeemed; for the necessity of subsequently attending to commercial, as well as scientific matters, gives rise to a mental anxiety which unfits the brain for continuous or elementary study, although it does not prevent the application of knowledge already gained to fresh objects, nor impede its development into new ramifications.

The result of this system is that those who ultimately attain scientific eminence, though not necessarily commercial prosperity, are a class who, as youths, are diligent and persevering from a deep and innate interest they take in the processes which are brought under their notice, but the conclusions at which they arrive are usually to a very great degree influenced by particular prejudices, and in many cases they cannot obtain information, even where they are desirous of profiting by the experience of others. This arises from one of two causes—either the principal is too much occupied to give any time to those whom he has undertaken to render proficient, or he is himself but ill informed in his profession. In this latter case it is hardly possible to condemn too strongly the conduct of the pretended instructor; but it is unhappily a fact that there are many calling themselves civil engineers who exist by taking pupils, when the latter are frequently better informed than themselves; and this is an evil which will probably last as long as engineers are allowed to practice without diplomas of some kind.

In the offices of such men as we refer to, the discouragement is immense, even sufficient to deter any but the most obstinately persevering from taking any interest in the course of life marked out for them; for although they may at first be attentive and diligent, yet the force of that evil example which encompasses them is but too apt to sap the very foundations of those good inclinations which, encouraged or even let alone, could scarcely fail, in the course of time, to bring honor to him in whom they are developed.

If a practical course of work is passed through by the student, in the first instance, he is in danger of imbibing from those with whom he is necessarily brought into contact an ignorant contempt for theory of all kinds, though fortunately this feeling does not appear to exist to nearly the extent to which it had spread during the last generation, a result probably due to the increased facilities for education afforded to the working classes; nevertheless, the remaining elements are quite serious enough to be carefully guarded against.

Making a model steam engine will not acquaint the learner with the nature of materials, as he will in after life have to deal with them, and, in all probability, unless his model is comparatively large, he will be forced to make it disproportionate in many details, especially steam passages and valves, and, in fact, as far as the real utility of such occupation to him is concerned, it is very little better than imaginary.

How, then, it will be asked, are we to proceed? We think by the following course:—Let the tyro be placed in such a position that he may have access to works, mechanical or civil, of magnitude and importance, use all endeavors to develop in his mind an interest in the general principles by which they are affected and the difficulties which arise during their progress; then let him study theory for each case as it arises, merely to enable him to understand those principles, and their application. Thus if he is diligent and intellectual, he will have most strongly impressed upon his mind the necessity of ascertaining and overcoming obstacles which can only be understood by inspection, and will value abstract science rightly as his guide in completing such projects as he may undertake. If, on the other hand, he is not diligent and intellectual, there is but one remark to make—let him not attempt to enter the profession.

In order to carry out the view promulgated above, a really honest intention to do his duty must exist in the engineer to whom the pupil may be articled, combined with a thorough knowledge in himself or his assistants of his business; and it is certainly the duty of guardians to ascertain whether such be the case in one with whom they propose to place a youth; for so long as they are careless, and charlatans, broken-down attorneys, and others of that numerous body of vultures that live upon the labor of the honest part of society, can style themselves civil engineers and obtain pupils, while the really competent members of the profession are too busy to attend to their pupils, we cannot hope for any amelioration of the grievance which now burdens it with so many incapables, who are useless to themselves and injurious to others.—*London Artizan.*

FARMERS' CLUB.

The Farmers' Club of the American Institute held its regular weekly meeting at its room at the Cooper Institute, on Tuesday afternoon, Aug. 22, the President, N. C. Ely, Esq , in the chair.

From the various subjects discussed we select the following items:—

KEEPING HORSES IN BASEMENTS.

The President stated that the Sixth-avenue Railroad Company, in building their immense stables a few years ago, made provision for keeping their hundreds of horses in the basement; but experience has proved that keeping horses in this way is terribly injurious to their health, and the Company have come to the conclusion that they cannot afford it. They are now altering their stables, at great expense, to bring all the stalls for the horses above the level of the ground.

ONE THOUSAND DOLLARS PER ACRE FOR STRAWBERRIES.

The President said that Mr. Chambers, the Secretary, had been making a visit in Connecticut, and had gone over the grounds of the Community, at Wallingford. They showed him a field of five acres cultivated in strawberries, and told him that they sold the crop this year for $5,000. The plants are cultivated in rows three feet apart.

Solon Robinson explained, in answer to an inquiry, that the runners are cut off, during the season of cultivation, by a sharp vertical knife attached to a plow, and the rows are kept narrow—some four inches wide.

Mr. Fuller remarked that he was gratified to hear these statistics, as when he made a statement in the Club a few years ago that he had raised strawberries at the rate of 600 bushels to the acre, and that a bushel of strawberries could be produced more cheaply and easily than a bushel of potatoes, his statement was discredited. He had no doubt that, by proper cultivation, $2,000 worth of strawberries can be grown on a single acre.

THE BOMBARDIER.

Dr. Trimble reported, in reply to a letter that was submitted to him inquiring the name of an insect, that it was a *bombardier*. These insects are pretty rapid runners, but when they are pursued by insects more rapid and more powerful than themselves, they have the power of discharging a very offensive liquid into the face of their pursuer. It is the skunk of insects. It can eject some twenty of these discharges at one time. It is a beetle with a brown body and black head.

MAKING MAPLE SUGAR IN THE FALL.

Mr. Young, of Bradford, Co., Pa., sent a communication, saying, that if maple trees are tapped in as the ground begins to freeze in the fall, the sap will run as freely as in spring, and will continue to run till the ground is frozen.

TRENCHING FOR GRAPES.

Mr. Quinn remarked that the strong assertions which had been made by writers, and by some successful cultivators, that grapes could not be grown unless the ground was spaded two spades deep, had deterred many persons from undertaking the culture. He had found that this deep spading is unnecessary. If the ground is thoroughly and deeply plowed and manured the grapevine will yield a good crop.

Mr. Sweet said that in Western New York grapes are raised on a very large scale, for New York market, without the use of the spade. The ground is cultivated as for corn. In the neighborhood of Crooked Lake there are some 3,000 or 4,000 acres planted to vines, probably 1,500 in bearing. A large steam mill is kept busy throughout the year in making boxes in which to transport the grapes to market.

GENERAL ROTTING OF THE GRAPES.

Dr. Trimble and others stated that during this month of August the grapes are very generally being ruined by rot and mildew.

Important Experiments with Protected Gunpowder.

The system of protecting gunpowder, invented by a Mr Gale, was tried at the recent Wimbledon rifle meeting in England with singular results. The London *Star* gives the following account of the proceedings :—

Slow matches were burned into vessels holding gunpowder mixed with the protective powder, and they only served to ignite a few isolated grains. Vesuvian matches were thrown into the powder, and were ignominiously extinguished. A red-hot poker was stirred through the powder, with no better (or worse) effect. But by far the most convincing test is that which was proposed by Lord Bury—namely, that a quantity of pure gunpowder should be placed in the center of the protecting gunpowder and the former fired. This experiment was also exhibited. The pure gunpowder was placed in a sort of pit inside the vessel, and carefully covered over with the protected powder; when the former exploded, it simply blew what was above it in the air, and had no effect in igniting the great mass that lay beneath and around it. Thereafter a portion of that surrounding mass was riddled in the usual way, and the residue exploded as ordinary powder will explode.

It requires only to be seen how larger machinery for the sifting of the powder and restoring it to its original state may be constructed so as to be easily used in a sudden emergency. For, though the advantage which the invention offers to the use of powder at home are sufficiently great, it is necessary to its adoption by the army and navy that its mechanical appliance should be of the swiftest and readiest kind. An objection has been raised on the ground that, after the gunpowder had been sifted, some portion of the protective powder would adhere to the grains. This is not the case, as has been proved by microscopic investigations; though Mr. Gale shows that, though it were the case, it would be no objection, as at present the coating of the powder, with blacklead, while in course of manufacture, gives additional force to the explosion.

The material which thus renders gunpowder temporarily innoxious is simply glass ground down to an exceedingly fine powder; various other substances have been tried (especially flint, which, however, became too floury and dusty), but not one has been found so useful and successful as glass. The cost of it is thirty shillings per tun. At present Mr. Gale advances three pounds of his powder to one of gunpowder as the safest proportion; but a much smaller proportion renders the gunpowder perfectly non-explosive; with this difference, however, that in equal parts of gunpowder and protective powder the former will burn, though it does not explode. A proportion of two to one burns slowly, three to one allows a few grains to ignite at haphazard, four to one is mere dead material. The rapidity with which the powder can be separated is somewhat remarkable, perhaps owing to the nature of the material with which it is mixed. Another advantage offered by this material is, that it keeps the powder perfectly dry, however the mixture may be exposed to the air, and it is well known that by itself gunpowder rapidly absorbs moisture from the atmosphere and becomes for the time useless.

FAST STEAMER.—Mark M. Mitchell, of Yarmouth, Maine, wagered $25 that he could walk to Portland, Me.—13½ miles—quicker than the steamer *Clipper* could get there, and won; time, 1h, 48m.

ANNUAL OF SCIENTIFIC DISCOVERY.

We are indebted to the editor, David A. Wells, A. M., M. D., for a copy of his "Year Book of Facts in Science and Art," for 1865. There is no work that we welcome more than this, as it enables us to glean and present to our readers any discoveries in science or art that we may have overlooked during the course of the year. We extract from this number the following items:—

A NEW APPLICATION OF THE SLACKING OF QUICKLIME.

A novel application of the slacking of quicklime has been proposed by Dr. John Davy, in the *Edinburgh New Philosophical Journal*. It is well known that as soon as water is added to and absorbed by well-burnt lime, fresh from the kiln, an immediate union takes place, the mass becoming broken up and falling into powder, with the production of much heat and steam. This does not take place when the lime has been exposed to the action of the air for two or three days, during which the lime generally absorbs a little water. With respect to these phenomena, Dr. Davy records the result of several experiments which showed the explosive power of the lime when placed in holes or receivers and treated with water, or with solutions of common salt, carbonate of ammonia, etc. We have no space for the details which led Dr. Davy to suggest the application of the explosive force of lime to the blasting of rocks and similar purposes, but give an account of two of his experiments. A boring was made in a block of sandstone about fifteen inches deep and two inches in diameter; this was filled with small pieces of quicklime, and the hole was closed by a plug of wood. No rending ensued, although the hydrate was formed. The elastic expansive force was not equal to the resistance, and the steam was condensed. A second experiment was made, substituting for the boring in a rock a strong earthenware jar, capable of holding about a quart. It was similarly charged, and tightly corked, the cork bound firmly down with a cord. After about 15 minutes an explosion took place, with a report like a pistol. The jar was broken in several pieces, and some of them were projected many yards from the spot. Now, as coal is not nearly so resisting as sandstone, and as its boring is easily effected, Dr. Davy expresses the hope that the experiment may be repeated in a colliery. It is easily made, at a cost not worth mentioning, is attended with no serious danger, and, should it be successful, it may conduce to the saving of many valuable lives.

SILK NATURALLY DYED.

Some experiments of an interesting character have recently been made in Italy, with a view of causing the silk-worm to produce silk ready dyed. On this point we know that when certain coloring matters, extracted from the vegetable kingdom, are mixed with the food of animals they are absorbed without decomposition and color the bones and tissues of the body. Starting from this fact, Messrs. Barri and Alessandrini, in Italy, sprinkled certain organic coloring matters over the mulberry leaves on which the silk-worms were feeding. M. Roulin, in France, employed in the same way the coloring matter known as *chica*. These attempts have met with partial success only, up to the present time. Colored cocoons were, however, thus produced several times. Some observers assert, however, that the silk was not really secreted in a colored state, but that the coloring matter sprinkled on the leaves merely adhered to the body of the grub and colored the cocoon mechanically during its construction. This appears to be the reason why the colored silk that was obtained in these experiments was neither uniform in tint nor of a good color. Others, however, still persist in a contrary opinion. M. Roulin commenced his experiments by sprinkling *indigo* over the mulberry leaves, and obtained *blue cocoons;* he then experimented with *chica*, a fine red dye extracted from the *Bignonia chica*, which the Indians of Oronoco employ to dye their skin, and obtained cocoons of a red color with a tolerably uniform tint, and of a permanent dye. He still continues these investigations, hoping to obtain silk ready dyed of all kinds of colors.

MORID'S PROCESS FOR RECOVERING WRITING ON PAPER OR PARCHMENT WHICH HAS BECOME NEARLY EFFACED.

The paper or parchment written on is first left for some time in contact with distilled water. It is then placed for five seconds in a solution of oxalic acid (1 of acid to 100 of water); next, after washing it, it is put in a vessel containing a solution of gallic acid (10 grains of acid to 300 of distilled water); and finally washed again and dried. The process should be carried forward with care and promptness, that any accidental discoloration of the paper may be avoided.—*Cosmos.*

PURE WATER FROM LEAD PIPES.

Dr. Schwartz, of Breslau, proposes to render lead pipes, used for water conveyance, innoxious, by filling the pipes, for a short time, with a strong solution of an alkaline sulphide. A coating of insoluble sulphide of lead is thus formed, which is said to act as a perfect protecting varnish, preventing further action between the water and lead.—*Chem. News.*

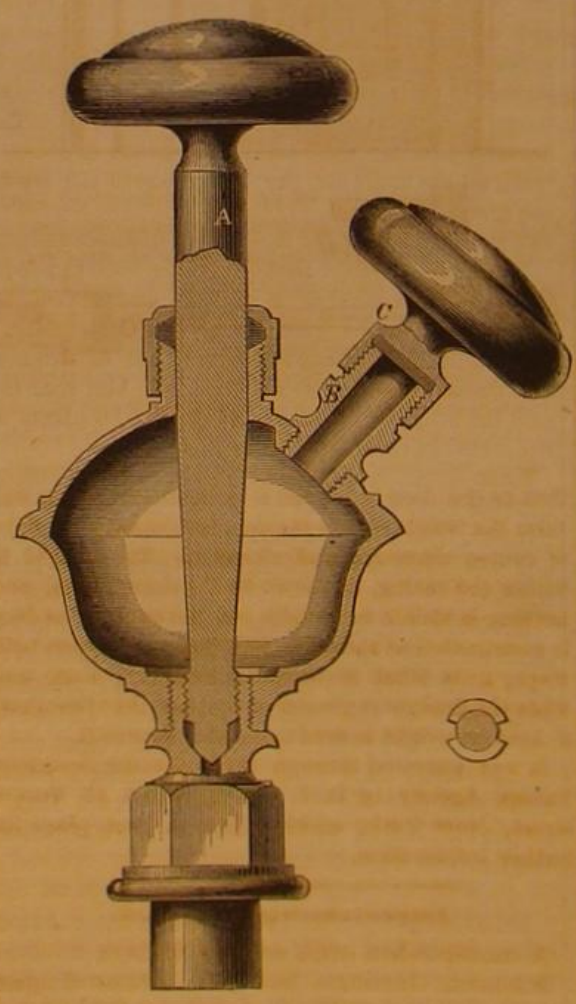
NEW METHOD OF DETECTING POISONS IN THE ANIMAL ECONOMY.

Dr. Machaltee, in a paper presented to the British Association on the use of the new process of dialysis for the detection of poisons, suggested that the stomach or intestines of an animal suspected of having been poisoned by any substance capable of being dialysed, might be made to act as their own dialygers, by simply tying the openings so as to securely inclose their contents, and then plunging them into a vessel of water for some hours, when the chrystalline poison, such as arsenic or strychnine, would dialyse out, and could be readily detected in the external fluid.

This work is published by Gould & Lincoln, Boston; Sheldon & Co., New York, and George S. Blanchard, Cincinnati.

BROUGHTON'S GRADUATING LUBRICATOR FOR STEAM ENGINES.

It is important that the valves and cylinders of steam engines should be oiled occasionally, since the



friction is not only lessened thereby at the time, but the expense of repair is much reduced. The lubricating faucet here shown is one of the simplest we have ever seen, and is constructed in the best manner and of the most serviceable material. The combination of mahogany and brass give it a neat appearance, also, so that it is ornamental to any steam engine. Its parts are few and simple, and a total absence of cocks and valves opening externally, which always wear and become leaky, is its most distinguishing feature, as will be seen by reference to the engraving.

It consists of a reservoir, with a stuffing box at top and a solid central stem, A, passing through the top of the reservoir, and screwing by a thread on its lower end directly into the shank, where it forms an internal valve in connection with a seat in the shank There is also an auxiliary opening, B, for filling which is closed by a tubular cap, C.

The central valve, when screwed down, cuts off the communication with the steam chest. The first rotation of the tubular cap, when taking it off to fill, will allow the steam in the reservoir to blow out, in a direction away from the hand of the operator; the oil can then be poured in, and the air will freely escape. The tubular cap has a composition seat, and forms a durable and perfectly tight joint. When the reservoir has been filled, and the cap replaced, the oil may be graduated to feed fast or slow, as required, by unscrewing the central stem, A, from a sixteenth to a quarter of a turn; or it may be fed at intervals by unscrewing for a few seconds, and then closing it again. The reservoir cannot be filled without leaving a small space, or air chamber, above the oil; into this the steam will rush when the valve is slacked, and the pressure will be equalized, and the oil pass out.

The formation of the stem is shown in the small figure; the grooves admit the oil when the valve is opened.

The central stem may be withdrawn at any time, without disturbing the packing in the stuffing-box, and the shank can be unscrewed from the reservoir. The handles are of wood, and, being non-conductors of heat, can be operated without using rags or cotton waste.

This simple arrangement forms a perfect lubricator, serving every purpose and performing every function required in lubricating valves and cylinders. Its advantages are: It will not leak, consequently it is clean, and wastes no oil; it will shut off the steam from the steam chest by an internal valve, not liable to wear; it will blow the steam out of the reservoir without the possibility of scalding the operator; the oil can be poured in without any open cup to catch dust and dirt, and the air can freely escape without the use of pet cock, or air passage; the oil may be all fed to the cylinder in one minute, or it may be graduated to last a whole day.

Manufactured by Broughton & Oakman, No. 41 Centre street (near Duane), New York.

New Silk Factory.

We learn from the Bridgeport (Conn.) *Standard* that the foundations of a new silk factory have just been laid in that thriving city, by Messrs. Johnson & Brainan, of Hartford. The main building will be one hundred and fifty feet in length by forty-six feet in breadth. It will be three stories in hight, with an attic; the hight of the first story will be sixteen feet four inches; of the second story, thirteen feet four inches, and of the third story, ten feet four inches, above a basement ten feet in hight. A wing seventy-five feet by twenty-two feet, will contain the engine, dye room, raw silk room, etc. On the first floor of the main building will be placed forty looms, weighing two tuns each. The manufactured articles will consist of sewing silk, twist, belt ribbons, etc. The work being light, girls will be mostly employed. This factory will thus be a public benefit in giving employment to a class which has hitherto been unprovided for in nearly if not all the industrial establishments of Bridgeport. This factory is to be built with all the modern improvements—every window will be hung with weights, and water and steam will be upon each floor.

In 1860 there were ninety establishments throughout the Union engaged in the manufacture of silk trimmings, such as fringes, gimps, buttons, etc. Their total capital was $1,183,280, yielding $2,804,322 annually in products. Raw material to the amount of $1,416,819 was yearly used, employing 919 male and 1,788 female hands in the manufacture, at an annual cost af labor of $618,380.

A NEW LADDER.—An interesting trial was made lately, in the spacious courtyard of the Archinto Palace, at Milan, with what the inventor, Paolo Porta, calls an "air ladder." It consists of several pieces, which, a sort of carriage as a basis, can be fixed one on top of another. A hight of 90 ft. was thus reached in a very few minutes. The apparatus may be bent down to an angle of 45° and is capable of carrying heavy weights. The principle, it is stated, can be adapted to portable bridges, which can be put together in an equally short time.

PHOTOGRAPHING THE MOON

We have now on the wall of our office the finest photograph of the moon that has ever been produced. The negative was taken by Lewis M. Rutherford, Esq., the well known amateur astronomer of this city, and the enlarged positive was made by O. G. Mason, a very intelligent and skillful photographer, of No. 599 Broadway. The negative is $1\frac{7}{10}$ inches in diameter, and the positive, 21 inches; it represents the satellite with one-half the illuminated surface turned toward the earth.

From the minuteness of the details and the sharpness of the outlines this photograph affords nearly as good an opportunity to study the surface of the moon as a direct view through a powerful telescope. The surface is extremely rough, and along the boundary line between the illuminated and unilluminated portions it presents the appearance of being a complete series of vast, deep cavities, with raised edges, and generally with a steep lofty cone rising from the bottom near the center. These cavities are all shaded upon the side next the sun, and illuminated upon the opposite side—showing that they are depressions and not hills; a white spot marks the summit of the central cone as it is tipped by the level rays, while the appearance of the circular boundaries of several of these cavities far out in the obscurity of the unilluminated region, proves conclusively that their edges are raised above the general level.

The light of the moon is so feeble that it will not produce an instantaneous photograph, but must continue to act for considerable time on even the most sensitive collodion in order to create a perfect image. As any change in the relative position of the moon, the telescope, and the negative would blur and destroy the image, it is necessary to have the telescope so mounted and moved that its axis will continue to point precisely to the same portion of the moon during all the time of the exposure. In other words, photographs of the moon can be taken by means of those telescopes only which are equatorially mounted. A revolving shaft is hung or suspended in a position precisely parallel to the surface of the earth; that is, pointing to the poles of the heavens, and the telescope is secured by a pivot to one side of this shaft. A gear wheel upon the end of the shaft is then connected with the works of a very accurate clock, which causes the shaft to rotate upon its axis once in twenty-four hours. Then, if the telescope is turned upon its pivot so as to point at the sun, as it is slowly revolved by the rotation of the shaft it will continue to point toward the sun during his whole circuit around the heavens. As the sun moves toward the east among the stars about one degree daily, to follow the track of any star the clock must be made to run a little faster; and as the moon sweeps along in the same direction daily some twelve degrees, to follow its course the telescope must be made to turn a good deal slower. There are also some minor modifications in the motion of the telescope required to preserve its line of collimation in precisely the same position in relation to the moon.

The second step is to obtain a perfect focus of the actinic rays. When a sunbeam is bent from its course by refraction, the three elements of which it is composed are refracted in different degrees—the heat rays being refracted the least, the light rays next, and the chemical or actinic rays the most.

Hence, if parallel rays of a sunbeam are concentrated by means of a convex lens, the focus of the actinic rays will be nearer the lens than the focus of the rays of light. To bring the focus in the proper position to produce a perfect image of the actinic rays, Mr. Rutherford ground a lens for his telescope for the special purpose of taking this photograph of the moon. He had a large telescope equatorially mounted, and he removed the object glass, and commenced the laborious task of grinding one with his own hands, adapted to the refrangibility of the actinic rays. This labor, frequently interrupted by the tedious process of testing, occupied about two years, and resulted in the production of this most perfect photograph of the moon ever taken:

Copies of this photograph may be purchased of Mr. Mason.

Itching caused by cowhage ("cow-itch") can be instantly alleviated by paraffin oil.

STAGG'S SELF-CLOSING DOOR.

This engraving represents an improved arrangement for closing doors, whereby the desired end is secured in a durable and reliable form. The plan is adapted to doors which have a stronger draught to encounter on one side than the other. It can be applied to almost any style of door, and is now in use in about 130 doors of public schools in this city, where it is highly approved.

The inventor fastens a wooden bar, A, to the top of the frame, B, where it is hinged. This bar is flush with the outside, and not visible, except on close examination; one of these bars is placed on each side of the door and jointed, as at C (Fig. 2), so as to be of the same thickness. To the front end of the bar is attached a sash weight in the usual manner, so

Fig. 1

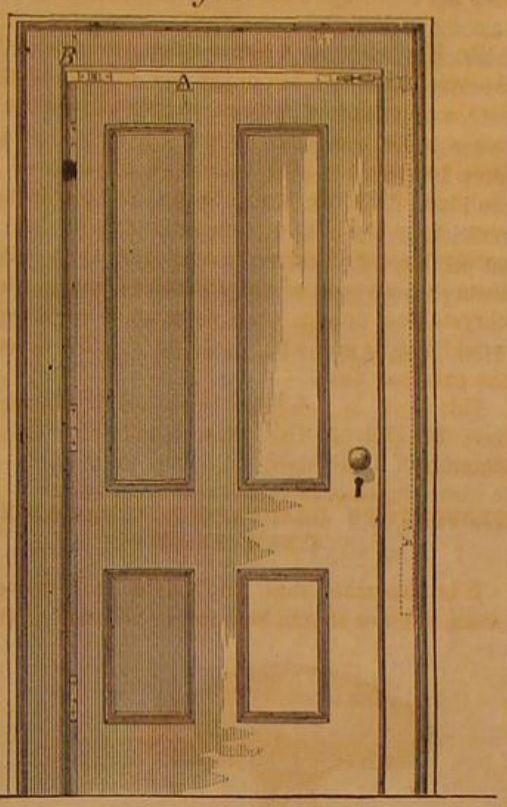


Fig. 3

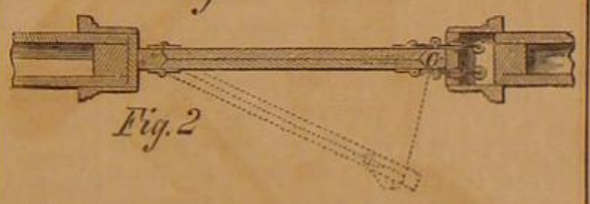


Fig. 2

that as the door is opened it will strike the bar and raise the weight; when the door is released the weight of course descends and closes it. The weight is within the casing, as shown by the dotted lines, and nothing is visible externally but the cord. The door is constructed as shown in Fig. 3, so as to open both ways; it is what is termed a swinging door, and when the draught is greater on one side than the other, a heavier weight is used to counterbalance it.

It was patented through the Scientific American Patent Agency by D. I. Stagg, of No. 15 Morton street, New York; address him at that place for further information.

Improvements Suggested.

A correspondent sends us the following:—

Washing.—Invention has been exhausted upon machines to wash with. Does it ever strike you that we are on the wrong track? That it is to chemistry we should refer instead of mechanics? Benzine, for example, takes up grease. The French *eau Javelle* takes up dirt with little rubbing, but it eats wool. Could the odor of benzine be got rid of cheaply, and the fluid be again used, it might lead to successful investigation in chemistry that would much further relieve our domestics of their hardest work.

Horseshoes.—In Paris horseshoes may not be roughed, because that wears out the macadamized paving so general on the great thoroughfares of that city; but it tells fearfully on horses. Paris would reward the inventor who would contrive a shoe which, without having picking projections, would yet have bite enough to keep from slipping. Intervening strips of steel might, by the quicker wearing down of the softer iron, keep up the required edge, and not be too costly.

Sewing Machines.—The sewing machine has done great service to humanity. But is it supposable that invention will not discover some plastic adhesive which will yet supersede all needlework seams?

Only throw out the idea of what is wanted and American inventors will make an effort to utilize it.

Anthrax.

SPECIAL NOTICES.

George W. Gardner, of Troy, N. Y., has petitioned for the extension of a patent granted to him on the 18th of November, 1851, and reissued May 31, 1864, for an improvement in stove-grate bars.

Parties wishing to oppose the above extension must appear and show cause on the 30th day of October next, at 12 o'clock, M., when the petition will be heard.

H. W. Hayden, Waterbury, Conn., has petitioned for the extension of a patent granted to him on the 16th of December, 1851, for an improvement in machinery for making kettles and articles of like character from disks of metal.

Parties wishing to oppose the above extension must appear and show cause on the 27th day of November next, at 12 o'clock, M., when the petition will be heard.

Francis A. Stevens, Chicago, Ill., has petitioned for the extension of a patent granted to him on the 25th day of November, 1851, for an improvement in railroad car brakes.

Parties wishing to oppose the above extension must appear and show cause on the 6th of November next, at 12 o'clock, M., when the petition will be heard.

Valuable Recipes.

Brewers' Pitch.—The following compound is recommended as a good and cheap substitute for brewers' pitch:—Coat twice the inside of a barrel with a solution of one-half pound of rosin, two ounces of shellac, two pounds of turpentine, and half an ounce of yellow wax in one quart of strong alcohol. After the complete drying of the second coat, give a last coat by applying a solution of one pound of shellac in one quart of strong alcohol. This varnish will perfectly cover up the pores, and does not crack off or impart a foreign taste to the beer.

To Color Straw Black.—The following is given to us as a black color for straw hats. The quantities of material are intended for 25 hats or bonnets. They are kept for two hours in a boiling decoction of 4 lbs. of log wood, 1 lb. of sumach, and of 5 oz. of fustic; afterwards they are dipped into a solution of nitrate of iron of 4 degrees Beaume, then well rinsed with water, and when dry, are painted over with a solution of gum or dextrine. The iron liquor, as well as the other ingredients, are kept by all dealers in dyestuffs.

A Good Cement.—An excellent cement for uniting articles of wood with metals, glass, stone, etc., may be obtained by dissolving glue in boiling water and making it of the same consistence as that of cabinet-makers' glue; then add, while stirring, a sufficient quantity of wood ashes as to produce a varnish-like mixture. While hot, the surfaces to be united must be covered or coated with this glue compound, and pressed together. When cold the surfaces will be found firmly united, and much force will be needed to separate them again.

Vehicle for Color.—By boiling shellac and borax in water you will obtain a solution of the lac, which may be used as a varnish or as a vehicle for colors; mixed with lamp-black, it has been used as an ink that will resist acids.

Chemical Cement.—A good cement for chemical and electrical apparatus may be prepared by mixing five pounds of resin, one pound of wax, one pound of red ocher, and two ounces of plaster of paris, and melting the whole with moderate heat.—*American Chemist and Druggist.*

The Sharp's rifle factory, at Hartford, was closed on the 19th August for the first time since it went into operation. All the Government contracts have been filled.

Correspondence

$10,000 for a Cotton Picker.

Messrs. Editors:—In pursuance and furtherance of your suggestion, in reference to the invention of a cheap, economical cotton-picker, I propose to be one of one hundred who, contributing one hundred dollars each, shall raise a fund of $10,000, to be paid to the inventor who shall first invent a machine that will be of practical character—as to price of machine, and mode of using adapted to the present mode of cotton culture, and performing in as good a manner, doing no more harm to the plant than is done in picking by hand, and with the same running expense—doing four times the work in a given time that is usually done by hand.

I would suggest that as soon as one thousand dollars are subscribed the money be placed in the hands of a receiver, and by him converted into 7·30 bonds or other U. S. securities; and, after that amount is paid in, the fund shall be held subject to the order of a committee (two-thirds of whom shall be practical cotton raisers), and not paid over until the machine has been thoroughly tested in the field by a majority of said committee or parties authorized to represent them.

Mr. D. W. Diggs, No. 52 Murray street, New York, will pay in my subscription as soon as $1,000 are subscribed. Should no one succeed in the invention within two years, or a reasonable time, the money, together with the accumulated interest, will be returned to the donors.

I have spent part of this day in examination of the various cotton machinery at the Patent Office, and am satisfied that the cotton picker we want will require some originality on the part of its inventor. But if once he hits the secret his fortune is made. I have been more particular in my stipulations on account of the strong prejudgment in the minds of most cotton planters against the possibility of a successful picker. They must be periectly assured of a fair trial and real success before they will put up their money.

With improved cotton-planters, cultivators and a successful picker, more cotton can be produced than has ever been, and with half the labor. Cotton dealers and spinners should see to it that these improvements are made for their benefit. I will take pleasure in giving all the information in my power to parties desiring to investigate this matter more fully. My address is Vicksburg, Miss. S. A. Duke.

Washington, D. C., Aug. 9, 1865.

The "Agamenticus."

Messrs. Editors:—I see you speak of the *Agamenticus* as a naval-built vessel, ironclad, with "a revolving turret." She has two turrets, each containing two 15-inch guns, and is, therefore, doubly armed to the *Dictator*.

How is the copper on her wooden bottom insulated, so that the galvanic action going on between the copper and the iron plating shall not shortly ruin the latter? This is a serious matter. Does the galvanic action go on equally in fresh water as in salt?

R. B. Forbes.

Boston, Mass., August 19, 1865.

[The galvanic action does not go on so rapidly in fresh water as in salt; zinc, copper and salt water make a pretty good galvanic battery. We can suggest only two ways to prevent the rusting of the armor plating, and perhaps neither is practicable. One is to completely insulate the armor plate from electrical communication with the copper, and the other is to connect the copper with a sufficient surface of zinc. When two metals in electrical communication are subject to chemical change, the chemical action is confined to the metal which is most easily acted upon—the positive metal, as it is called. In salt water iron is positive to copper, but zinc is positive to iron; and if a sufficient connection could be made between the zinc plate and the copper, the iron armor would be preserved. Perhaps a broad band of zinc round the vessel at the water line—extending above and below that line—and riveted at short intervals to the copper, might be sufficient. It is well known that this will cause the copper to foul, but so will the rusting of the iron armor plate.—Eds.

Why Does Sound Travel Better Just Before a Storm?

Messrs. Editors:—In answer to an inquiry on this subject, on page 100, present volume, Scientific American, I offer the following explanation:—Moist air is a better conductor of sound than dry air. When the air is in a high degree of humidity, as is usually the case before and during rainy weather, speaking, music, ringing of bells and any sound can be heard at much greater distances than in dry weather, even during a perfect calm. To this I would also add, that moist air is also more transparent. In this condition of the air distant objects can be seen better than when the air is dry. Yet when the distant mountains are veiled in a heavy whitish gray, when the sky around the horizon presents a belt of the same color, and the rest of the sky itself has a whitish gray appearance, there is no prospect of rain for several days to come, until this whitish veil disappears, when the mountains and other distant objects appear perfectly clear or only under a light shade of a deep blue, and the sky presents a uniform deep pure blue. This whitish gray is a *sign* of the dry condition of the air; it is essentially different from that produced by the smoke of burning brushwood, burning woods or the exhalations of a large city.

J. G. Konvalinka.

New York, August 17, 1865.

A Problem.

Messrs. Editors:—With one screw double the diameter of another—both being same pitch—with the same length of lever from centers of screws, and same force, will one raise more weight than the other? If so, why? W. A. B.

New York, August 15, 1865.

[Our method of deciding questions like this is to inquire whether, with the same force moving at the same velocity, the weight is raised any slower in one case than in the other. If it is not, the conclusion is perfectly safe that no greater weight could he raised. If you have a screw an inch in diameter, with six threads to the inch, and another two inches in diameter, with six threads to the inch, the same number of revolutions in each would raise a weight the same distance; hence, it must be that they would raise it with the same force.

In the case of the larger screw there is less difference in the length of the two arms of the lever, but the plane is inclined at a more acute angle; in other words, the ascent is not so steep. As the rubbing surfaces travel in the larger screw a greater distance one over the other, the friction in this is greater, and to that extent the advantage is with the smaller screw.—Eds.

An Idea for Cotton Planters.

Messrs. Editors:—On page 87, of the Scientific American, I notice an article on the subject of picking cotton by machinery. The difficulty that you mention, viz., the irregular hight of the stalk and ripening of the balls, can be easily overcome. But there is one difficulty in the present style of planting cotton that cannot be overcome by machinery, and that is, the stalks stand so close in the rows that the longer branches interlock, making it impossible to reach the balls that grow on them without injuring the small branches. But this, it appears to me, might be prevented by planting so far apart that the branches will not interfere. Now, if this can be done without materially depreciating the crop, then cotton can be harvested by machinery as well as any other crop; for a machine can be made that will pick the ripe balls without disturbing the unripe ones or injuring even a leaf, or without any delicate or complicated machinery, and can be operated by any one who can handle a plow; can be made at a cost of fifty dollars, and will pick ten acres of cotton in a day.

If you think that a machine with the above-mentioned qualities will answer the purpose, I will be pleased to hear from you. J. H. G.

Pennsylvania, August 11, 1865.

India-rubber Covers for Cans Wanted.

Messrs. Editors:—I write to ask if there are such things as gum-cloth covers for sealing fruit; and if there are not, to suggest that some be made as soon as possible. They can be similar to nursing tubes for infants. Many persons tie gum-cloth over their jars, which goes to prove that the thing is feasible, but if they were to be made to stretch over and stay they would be infinitely better.

Do please have some made soon. Don't wait to get a patent, while we poor women are burning our fingers and exhausting our patience with cement; nor do not say use self-sealing cans; they are too expensive, while we have dozens of glass and stone jars in our pantries that were bought before self-sealers were invented. As I do not know Mr. Goodyear's address, I send this to you, and beseech you to attend to it immediately. I want two dozen covers this minute to seal peaches with. D. B.

New Hope, Pa., August 12, 1865.

The Law of Sex.

Messrs. Editors.—Inclosed please find a slip, cut from an exchange, referring to an article in the Scientific American relating to the law of sex. If the writer, de Ferrendi, calls this notion a new one, he is very much mistaken. In a little work published by us, and written in Germany a hundred years ago, this whole subject is laid before the reader very definitely. The work was written, but not published, in Germany, and we send you a copy, which please examine. Miller, Wood & Co.,

Publishers *Herald of Health* and *Journal Physical Culture*.

New York, August 4, 1865.

[It will be remembered that M. de Ferrendi claimed to have discovered the cause of animals being born of the male sex, or of the female sex. On examining the work published by Miller, Wood & Co., which was written by P. F. Sixt, M. D., practicing physician of Erfurt, we find the same idea as Ferrendi's fully set forth. We must add, however, that we have not yet received any satisfactory proof of its truth. —Eds.

A Convenient Disinfectant.

Messrs. Editors:—The most convenient and, I believe, the most effective disinfectant, is chloric ether. It should be burned in a glass spirit lamp, which is liable to the same mishaps as other spirit lamps. Any place of the size of an ordinary room, that can be closed, can be completely deodorized and *disinfected* by five minutes' use of one of these lamps. For sick rooms they are invaluable, if care he taken not to use them any longer than to accomplish the purpose, as otherwise it might become disagreeable from the smell of chlorine. A convenient and sufficiently accurate way to obtain this ether is to mix one part chloroform and six of alcohol. If hydrogen in some combination is the medium of most "smells" and infections, as is frequently declared, the reaction which takes place readily explains and verifies the advantage of using this ether. R. H. A.

Baltimore, Md., August 19, 1865.

[Great care should be taken not to burn this substance too long.—Eds.

Drying by Steam.

Messrs. Editors:—We have a drying room in our laundry, for drying clothes, which is heated by steam. Now, I wish to inquire of you if super-heating the steam would make the room hotter. We have a pressure on the pipes of about 70 lbs. to the inch, as indicated by the gage. Geo. P. Leonard.

Newport, R. I., August 16, 1865.

[A complete problem, to be settled by experiment only. With the same pressure, you would have a higher temperature with super-heated than with saturated steam, but the particles would be further apart and might not transmit their heat so rapidly to the iron. In both cases the rapidity of the circulation would be a very important element.—Eds.

Substitute for India-rubber.

Messrs. Editors:—Among the many applications of petroleum I notice one of a very strange character —I refer to the invention of our citizen, Mr. John Root. After a great deal of patience and skill he has really succeeded in making a composition that vies with vulcanized rubber for strength and usefulness, from the solid residuum that remains in the still after the more volatile vapors are driven off the

well-oil or petroleum. I have seen some very beautiful picture frames and medallions, equal, in fact, to any manufactured from rubber. He also makes bottles and jars of the same composition. Truly we live in an age of improvement.

JAMES HANSCROFT.

Cincinnati, August 13, 1865.

Results of the War.

The following extract from a letter from one of our old friends in the South, gives a vivid picture of the results of the war:—

MESSRS. EDITORS:—Permit me once more, after four years of silence, to extend to you the hand of fellowship. It will probably interest you to know that I have never taken any part in the rebellion. With much difficulty and many dangers, I passed through it; God knows how. My father's great estates have been desolated; he lost ten thousand bales of cotton by the Confederate order to burn it; his negroes form many companies in the U. S. Army; his cattle fed one division of Sherman's army a long time; his wood run the fleet up and down the Mississippi oftener than was good for anybody. He certainly ought to have been arrested by the Confederates as an aider and abettor of "the enemy." I ventured down the river from home in the fall of '63, and succeeded in getting out some remnants of cotton that escaped burning on my father's plantations. In 1864 I took a Northern partner and undertook to cultivate a plantation on the new system; but, on going to Island No. 10 for negroes (there being some two hundred there formerly belonging to me), I and my partner were both arrested, and had the pleasure of a two months' sojourn at Cairo, where we studied the natural history of some disagreeable insects, and learned to appreciate a keen remark made by a poor fellow who was sick in that infernal place. He declared he would rather die at Cairo than at any other place on the globe; and, on being asked why, replied: "It was the only place he could leave without regret." This year, I and my partner are cultivating five hundred acres in cotton and three hundred in corn, both of which are doing well. We expect our freedmen to do half work; so far they have done much better than might have been expected; we have about eighty, hired at an average of $10 per month and their food. The great difficulty is to get them to pick cotton, which they seem to detest."

Louisville, Ky., Aug., 1865.

Of a Tool Above or Below the Center.

MESSRS. EDITORS:—There is a very important reason why a tool above or below the center will not produce a true taper, and can only produce a true taper by moving exactly on, or level with, the center. The action of a cutting tool approaching to, or receding from, the apex of a cone, above or below the center, comes under the laws of the conic sections, and, although the tool may trace a straight line, the plane cutting the center and parallel thereto is part of a hyperbolic curve.

Any person can illustrate this fact by tracing the true taper to its apex, which becomes a cone. Then any plane cutting the sides of the cone and parallel with its axis and not coincident therewith, produces at its intersection with the sides of the cone one of the forms of a hyperbolic curve. The tool, moving in a straight line, will produce the complement of the above curve. The imaginary cone would have no apex.

G. D. HISCOX.

No. 76 John street, New York.

SOUTHERN PATENTS.

A correspondent residing in Georgia states that he took out a patent in the United States previous to the rebellion, and desires to know how his rights have been affected by the attempted secession of his State. For the general benefit of all patentees residing in those States, we will remark that they are still valid, and all who hold them can exercise the same rights in them as before the rebellion, provided such patentees or assignees are not excluded by the terms of the President's Amnesty Proclamation or the confiscation laws passed by Congress.

THE Middletown (Conn.) Tool Company has purchased, for $10,000, the patents of Jno. R. Henshaw's Self-closing Hooks, issued in 1864.

RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week; the claims may be found in the official list:—

Packing for Well Tubes.—The object of this invention is to produce a packing for oil and other deep wells which may be applied when the tube is in the well, and be removed without disturbing the tube. It consists, in general terms, of an upper and lower head, each consisting of an annular plate of metal, between which are placed annular plates or rings of leather, felt, rubber, gutta-percha, or other elastic or flexible material, which rings are connected to each other along both their inner and outer edges in alternation—the first and last of the series being also connected to the said metallic rings. By drawing out the apparatus lengthwise, the rings are drawn asunder, their faces lying in angular directions with respect to each other; and their outer and inner circumferences being drawn toward each other in proportion to the greatness of the angle made between adjacent rings. By letting the rings come together, their inner and outer circumferences resume their former positions, when they will touch the sides of the well tube and of the well respectively. P. Sicouret, of Saragossa, Spain, now at No. 152 Eighth avenue, New York, is the inventor.

Removing Buildings.—This is an ingenious apparatus by which dwellings and other structures may be readily moved up and down hill, or over uneven surfaces, without straining or injuring the plastering and without the trouble of leveling the track. J. S. McIntire, No. 68 Cass street, Chicago, Ill., is the inventor.

Shutter Hinge—This invention provides a means for keeping blinds, shutters and doors locked, when in an open position, by the movement of the hinge itself, without the necessity of using a separate and distinct device therefor; and this is effected by a very simple and durable arrangement of a small swinging bar or bolt attached to one leaf of the hinge, so arranged that when the shutter is thrown open the bar or bolt falls into a slot and between two contiguous projections upon the lower edge of each leaf of the hinge. The blind or shutter, when open, is held so securely and without any great strain upon the hinge that no ordinary gale of wind can injure it, and, at the same time, the attachment is so simple, and the movement so easy, that a child can close the blind or shutter without any perceptible effort. Its durability and simplicity of action, combined with the fact that it can be made at a mere trifling additional cost above the present price of shutter hinges, recommend it to the consideration of manufacturers. Samuel R. Dummer, of No. 137 Broadway, New York, is the inventor.

Brewers' Liquid Cooler.—This invention consists in the use of cores made of wood, metal or any other suitable material, either solid or hollow, and of any desirable form or shape, in combination with a series of refrigerating pipes, in such a manner that by the introduction of said cores in the pipes the liquid passing through said pipes is compelled to form a thin annular sheet, which, being in contact with the cold sides of the pipes, is rapidly cooled. The refrigerating pipes are secured at one end to a partition extending in a longitudinal direction through the cooling vat, whereas their opposite ends are connected by a longitudinal pipe, which is so situated that the cooling pipes are free to expand or contract without danger of producing a strain, which would be liable to start the joints. Plugs or stopcocks inserted into the longitudinal connecting pipe, and gates placed in the space between the longitudinal partition and the next adjoining inside surface of the front side of the vat, divide the refrigerating pipes off in sections, through which the beer or liquid to be cooled passes in a zig-zag course, whereby the cooling effect is considerably facilitated. Suitable holes in the front side and end of the cooling vat opposite the ends of the refrigerating pipes allow of introducing into said pipes a scraper or brush, for the purpose of cleaning the same with ease and facility. Chas. R. M. Wall, of Brooklyn, N. Y., is the inventor.

Rose Engine.—This invention relates to certain improvements in rose engines intended for cutting glass, and it consists in the use of a parallelogram, the sides of which are hinged together, in combination with a box calculated to hold a fork or other equivalent device that forms the bearing for the shaft of the revolving tool, in such a manner that said tool can be readily held up to or taken off from the work without danger of causing jerks or jars which would have a tendency to break or injure the work. The invention consists, further, in the application of a hinged tool-holder, in combination with a carriage or slide moving back and forth in a suitable rest, in such a manner that by means of the rest the tooth can be adjusted to any desired position in the usual manner, and by the hinged holder can be brought up to or removed from the surface of the work with the greatest ease and facility, and without danger of spoiling the work. It consists, finally, in securing the shaft of the revolving tool in a forked or other bracket, which is connected to the rest or supports by a set screw or other suitable means, in such a manner that said tool can be readily turned in either direction or detached from the supporter and replaced by another of the same or of different shape. Anton Schwitter, No. 177 Broadway, New York, is the inventor.

Sorghum Evaporator.—This invention relates to a new and improved pan for evaporating sugar, designed chiefly for evaporating sorghum, and it consists in the employment or use of movable partitions, with an open end pan, and also a side chimney for the furnace, whereby a superior article of sirup is obtained, and the evaporating process rendered continuous, it not being necessary to stop in order to cleanse the pan and remove the latter from the furnace, as is now required. Joel Kindley, Oskaloosa, Iowa, is the inventor.

MISCELLANEOUS SUMMARY.

IN London we have the French baloon *L'Esperance*, which the inventor hopes to be able to navigate. I think, in a dead calm, it might be made to go two miles an hour. They do get steerage-way on it and turn it round. It can be elevated and depressed, also, with its horizontal propeller, with some effect. This is all. Your Hoboken machine, of which I have seen an account, has too many propellers. You might as well have a bird with six wings. Two are sufficient for every purpose. There must be two to balance each other and keep the body from whirling about, but the same force that raises the propelling power will cary it in any direction. The common error in such matters is to begin with a too complicated apparatus.

THE bronze manufacturers of Paris, who enjoy a world-wide reputation, have resolved to give prizes for which their workmen may compete. They propose to give £32 for a sculptured work of art; a similar sum for a sculptured ornament; £64 for the best chiseled work; £20 for the best drawing; £24 to the founder who shall turn out the best work; £16 to the best turner; and £12 to the best fitter. There are likewise medals to be given and "honorable mention" to be made of those who distinguish themselves. Those who wish to compete must send in their works between the 10th and 16th of November next.

SEVERAL of the London tradesmen, who possess valuable stores, are having their safes connected, by means of the telegraph, with the police station nearest to them, so that the thief, by attempting to open the safe, will be the cause of his own immediate arrest.

AN interesting invention for English capitalists has just been credited to a French civil engineer, M. Bouquie. He has found the solution of the difficulty of navigating canals by steam, and his boats are at work on the canal from Mons to Conde.

NATIONAL DEBT.—The debt of the United States on the 31st of July, according to the Secretary of the Treasury's official report, amounted to $2,874,092,908; with cash in the Treasury, $116,739,632. The aggregate annual interest, $139,262,368.

A PHILADELPHIA worsted factory recently received an order for $1,000 worth of scarfs, shawls, etc., from Leicester, England, a town principally devoted to zephyr manufacture. Evidently they want to get the latest styles.

On the 2d of August the blast furnace at Fort Edward, N. Y., blew up with a terrific explosion, destroying nearly every thing. The loss is $15,000.

Improved Car Shackle.

Some of the most serious accidents on record have been caused by persons getting caught between cars when coupling the same. The present method of connecting trains is absurd; if it can be proven that self-locking and self-detaching apparatus are reliable under all circumstances, they should be adopted.

The arrangement here shown is a simple one for the purpose. By the use of it a train of cars can be completely connected without a hand touching the shackle or going between the cars, and all lateral motion and inequalities of hight are provided for.

Figs. 1 and 2 show the invention in detail and in perspective. In Fig. 1 the shackle bar, A, is seen projecting; in Fig. 2 the internal arrangement is shown. The shackle bar is alike on both ends, and is caught by levers, B, which are hollowed out internally so as to fit snugly to the shackle bar. At C (Fig. 2), there is a socket backed up by a spring, D; against this socket and spring the shackle bar strikes, and destroys the unpleasant shock and danger of breaking which would otherwise occur

It is therefore easy to understand that, by simply backing up the train, the shackle bar will enter the flaring end of the casting, E, and be directed to the levers which it will pass through and catch against when pulled the reversed way, thus forming a most efficient arrangement for the purpose. To detach the car it is only necessary to throw the detaining levers, B, apart by the projections, F, and levers, G, when they will move as shown in the dotted lines.

It was patented by Charles Clinton through the Scientific American Patent Agency, on February 14, 1865; for further information address Jonah K. Payne, Goshen, N. Y.

Fig. 1

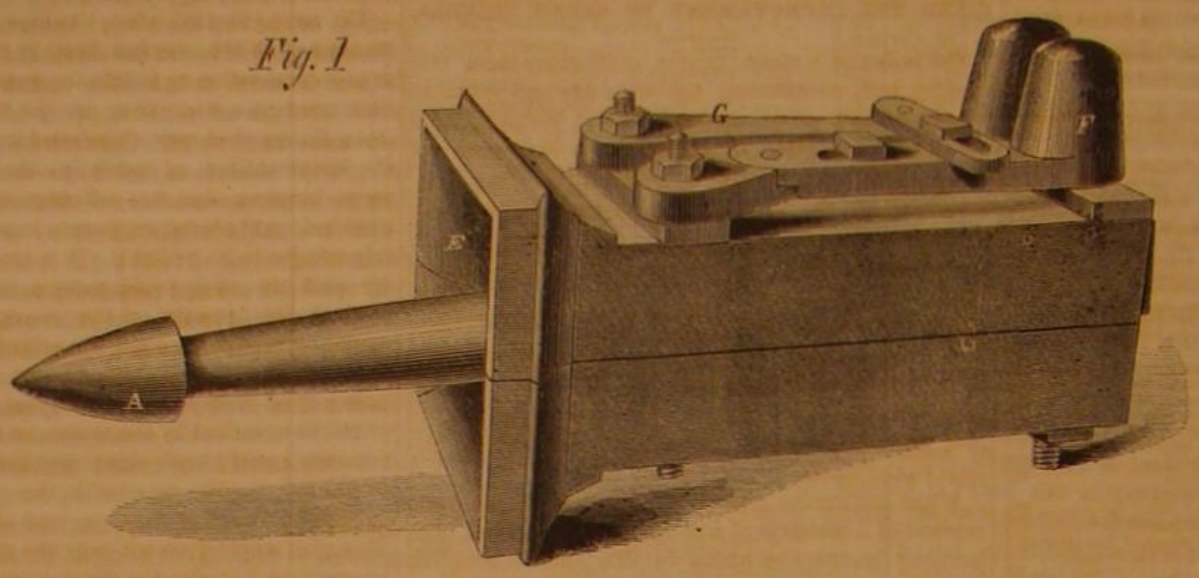
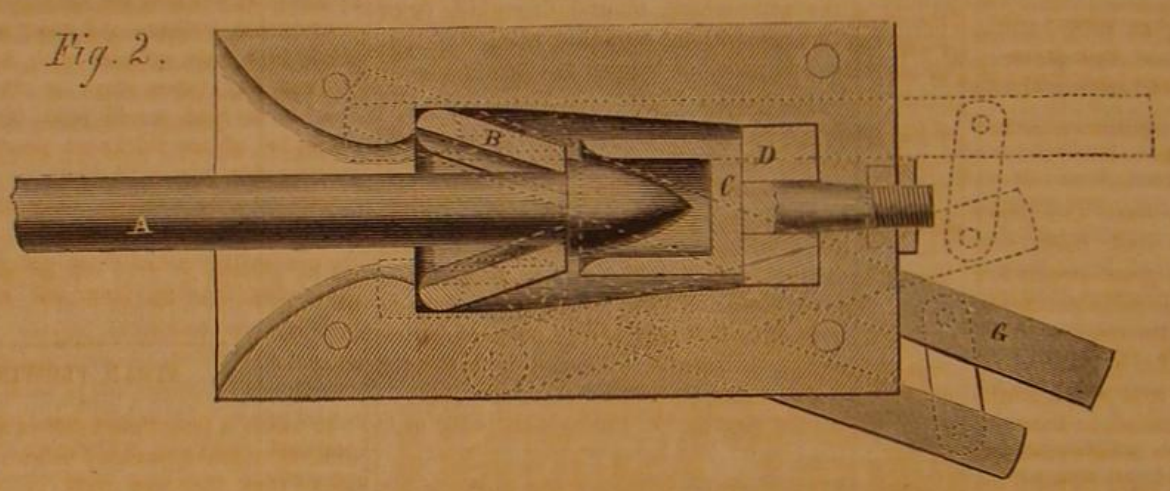


Fig. 2.



CLINTON'S CAR SHACKLE.

New Process of Picture Cleaning.

Oil pictures of ancient date become clouded by dust deposit; this can be wiped off. They also are obscured by an opacity in the varnish surface; this can be scraped away, but rarely without serious detriment to the pictures. Too many flayed and glaring wrecks of what were once noble efforts of pictorial art exist to warn the artist covetous of immortality; but the Professor's process gives us hope that their numbers need not be increased—that the picture-cleaner's noxious vocation will soon be finally superseded. Science has disclosed the true means of restoration. The opacity of the varnish arises from a molecular change; the resinous particles of which it is composed become displaced in course of time, and when so displaced their transparent quality is lost. These atoms, once restored to their original cohesion, recover lucidity; and this can be effected by exposing the surface of the picture to the fumes of alcohol. The spirit, when absorbed, evaporates; the varnish coating has received new life, and is left as hard as it was before—perhaps harder. The hand of man, throughout the operation, has never approached the surface of the picture. Professor Pettenkofer has patented this application of alcohol in England, and it is said to have been tried with complete success on sixteen of the pictures in the National Gallery.

French Ironclads.

A letter from Toulon says :—"The Administration of the Marine has just received a fresh supply of plates destined for the steam ram *Taureau*. This vessel has already absorbed 162 plates of 12 centimeters thick (about 4½ inches), the price of which amounted to 380,000 fr. Two frigates of the type of the *Gloire* and the *Provence* are covered with a cuirass valued at 800,000 fr., but since the invention of the new system of destruction, now in course of trial in every navy, it has been thought fit to augment in proportion the means of defense, and henceforward the protecting plates will have a thickness of 20 centimeters instead of 12. The first experiment will take place in the *Marengo*, ship-of-the-line, now being built at the Mourillon, and it appears that the novelty above-mentioned will not be the only one. This ship, it is said, will carry a battery of twelve cannon only, but they will be of stupendous bulk and bore.

[Abroad, "stupendous bore" means ten-inch guns. —Eds.

SHIP-BUILDING IN BOSTON.

Ship-building is quite active in Boston, many sailing vessels being on the stocks, and some few steamers. Of the latter, Donald McKay, Esq., has four vessels in process of construction. These vessels are built of the best material, and with great care. They have specially fine models, and are intended for the coasting trade. They are screw ships, 167 feet long, 27 feet beam and 22 feet depth of hold. The engines are vertical, with cylinders of 36 inches diameter and 30-inch stroke. They have horizontal tubular boilers, with 2,250 feet of heating surface and 73 feet of grate surface. The screws are of iron, 10 feet in diameter and 15 feet pitch. The vessels are fore-top-sail schooner-rigged, and are built on the owners' account, either for a market, or to be run, as is deemed desirable.

New Suspension Bridge.

The Allegheny river bridge, at Oil City, is to be a suspension bridge of two spans of 325 feet each, and one semi-span of 162½ feet, the latter on the Oil City side. The platform will be thirty-five feet above the present level of the river, and will consist of a double track for teams, 17 feet wide, and sidewalks some five feet above the latter, and between the track and the suspenders. The platform is to be attached to the cable by nine suspending rods, without adjustments, and the cables, two in number, are composed of No. 10 hand-drawn charcoal iron wire, thoroughly wrapped throughout their whole length with annealed wire of a smaller size, by means of machinery, and made impervious to water by paint and other substances They will be anchored into the abutments on Oil City side, and with separate anchorage masses on the Latonia side.—*Oil City Register.*

20,000 Tuns of Rock at a Blast.

The breakwater now being erected at the picturesque Port Erin Bay, in the Isle of Man, at a cost of nearly £60,000, is making great progress. Port Erin Bay is an almost naturally-formed harbor of refuge, requiring merely the breakwater now being erected in front of part of the entrance to completely land-lock it. The adjoining coast is very rocky and precipitous, and therefore the Port Erin Harbor of Refuge will be of great service, especially to the immense herring fleet belonging to the island, and also to the shipping, lying, as it does, right in the track of the American and Irish traders. During the last few weeks Mr. Matthews, the engineer of the works, has been superintending preparations that have been actively made to clear away by explosion an immense mass of rocks which interfered with the progress of the works. For this purpose fourteen chambers, each about 25 feet deep, were drilled into the solid rocks, which are so hard that it fully occupied the time of three men several days to drill each chamber. In each chamber was deposited 50 lbs. of gunpowder, so that altogether 700 lbs. of powder were used. The discharge of such a large quantity of powder, and the upheaval of such an immense mass of rocks as it was expected the explosion would clear away, made it necessary that extreme caution should be exercised in order to guard against accidents; and, therefore, the fact that such an operation was to take place was generally kept secret. In spite, however, of the determination to keep the matter as quiet as possible, it somehow or other "got wind," and, consequently, a large number of persons, among whom were many of the principal gentlemen of the island, assembled to witness the explosion. Fourteen men were told off to fire the fuses, and at a given signal they attached the matches and quickly retired. The result is thus described by an eyewitness :—"In a very short time, during which the spectators held their breath from exciting expectancy, about half a dozen of the chambers exploded, and, with a dull, heavy boom hurled out an immense body of rocks. After a brief pause the earth again trembled, and the bosom of the adjoining ocean heaved, as the remaining chambers went off with a force that made you fancy you were in the vicinity of an earthquake during an eruption. The grand result was that about 20,000 tuns of solid rock were torn from the position they had held for countless ages and hurled on to a roadway which, a few minutes before, had been as clear as a high road.—*Manchester (England) Courier.*

Electrical Condition of Mineral Waters.—At the last sitting of the Academy of Sciences, M. Scoutetten sent in a paper on certain further researches of his for the purpose of proving that the electrical state of mineral waters is the chief cause of their activity. He contends that these waters, on issuing from the earth, are in a state of peculiar activity owing to certain chemical reactions which produce dynamic electrical phenomena; a fact which by no means impairs the activity of their chemical elements on the human body.

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VOL. XIII. NO. 10...[NEW SERIES.]...*Twentieth Year.*

NEW YORK, SATURDAY, SEPTEMBER 2, 1865.

Contents:

(Illustrations are indicated by an asterisk.)

TWENTY YEARS.

Twenty years have passed away since this paper commenced its existence. As we look back upon that time it seems short, but what great events are crowded into its span. With the possible exception of the period of the first French Revolution—from 1789 to 1809—there is no equal portion of history that marks so great a progress in those arts which ameliorate the physical condition of mankind, in those labors by which our intellectual nature is informed and developed, in those struggles which carry forward the political emancipation and elevation of the race, and in those discoveries by which our knowledge of the universe is enlarged.

Two great inventions—the sewing machine and the reaping machine—by which, with the same labor, the supply is augmented of the first two necessaries of life—food and clothing—have been brought forth and developed into practical use during these twenty years. Both of these are purely American inventions. At the other extremity of the scale, an invention by which intelligence is flashed to the ends of the earth in the twinkling of an eye, was announced in our first number, and has since been spread over every quarter of the globe. In the multitude of minor improvements by which the comforts, conveniences and luxuries of life are multiplied, no equal period in the history of the arts can compare with the latest.

The last twenty years have witnessed the commencement and progress of a great reform in education. The leading institutions of learning in England and America have ceased to confine their pupils to a study of the literature of Greece and Rome, and have begun to impart to the most highly cultivated intellects of the two nations, some knowledge of the universe in which we live. The great minds of future generations only will be able fully to appreciate the inconceivable blessings which will result from this reform.

This fruitful period has also witnessed a gigantic rebellion against the Government of the United States—resulting in the overthrow of slavery and the consequent demand for a new class of inventions as a substitute, to some extent, for slave labor, in the cultivation of the great Southern staples.

Finally, the last twenty years, besides many minor discoveries in science, have developed one which ranks among the most sublime triumphs of the human mind. By means of spectrum analysis, the chemist conquers the immeasurable distances which stretch between us and the fixed stars, and even the far greater spaces which divide us from the nebulæ, and learns with certainty what are the elementary substances which make up the constitution of those remote bodies.

With the record of this marvelous progress in all departments of life our pages in the past have been enriched; and, in view of the constantly accelerated march of invention, discovery and improvement, it may be reasonably hoped that they will be not less opulent in the future. Considering, however, the unimaginable character of past discoveries, who will venture even to dream of the nature of those which may come forth in the years that are before us?

FIELD FOR IMPROVEMENT IN STEAM BOILERS.

The boiler of a steam engine costs more than the engine; and, considering the wide use and valuable service of this prime motor, there is, perhaps, with the single exception of the plow, no instrument of more importance. There is, perhaps, also, notwithstanding all the inventive faculty and experiment that have been expended upon it, no instrument more imperfect. A boiler of ideal perfection should secure complete combustion of the fuel, so as to obtain all the heat which the coal will yield; it should transfer this heat to the water to form steam, and it should hold the steam in absolute security. In practice, very few boilers effect complete combustion of the fuel, and none secure the transfer of nearly all the heat to the water.

When anthracite coal is the fuel used, the only portion of it which is of any value is its carbon. The burning is the combining of this carbon with the oxygen of the atmosphere. Carbon combines with oxygen in two proportions—one atom of carbon combining with one atom of oxygen to form carbonic oxide, and one atom of carbon combining with two of oxygen to form carbonic acid. According to the experiments of Favre and Silberman, one pound of carbon, burned to carbonic oxide, will raise the temperature one degree, of Fahrenheit's scale, of 4,451 lbs. of water, while a pound of carbon, completely burned to carbonic acid, will heat one degree Fah. 14,544 lbs. of water. Hence, coal burned only to carbonic oxide generates less than one-third of the heat of which it is capable. When coal is burned with an insufficient supply of air, either the whole or a portion of the product of combustion is carbonic oxide.

But the greatest loss of heat in steam boilers is the failure to secure the transfer of all the heat generated from the products of combustion to the water. In order to effect this as nearly as possible the tubes should have the thinnest walls practicable, as we recently pointed out. It is also quite as important that the walls of the fire-box should be of thin plate.

Heat is radiated from all substances with a rapidity proportioned to their temperature. When, therefore, two bodies of different temperatures are placed in contiguity, the warmer will send its heat into the other more rapidly than it will receive heat from the other in return, consequently the cooler will be warmed with a rapidity proportioned to the difference in the temperatures of the two. The same law applies to the transfer of heat by conduction from one body to another; it takes place with a rapidity in proportion to the difference of the temperatures.

Suppose we have a fire-box plate four inches in thickness, with fire on one side and water on the other; the surface next the fire may be red-hot, while that next the water is only 250 or 300 degrees. There being, then, but little difference between the temperature of the gaseous products of combustion and that of the contiguous surface of iron, the transfer of heat from one to the other goes on slowly; and the same is the case with the transfer of heat from the interior surface to the water. In this case the products of combustion go up the chimney at a high temperature, carrying away nearly all the heat generated. If the plate is thin there can never be this great difference in the temperature of the two surfaces—the surface next the fire will be cooler and that next the water will be hotter; the transfer of heat will, therefore, be more rapid, and the rapidity will be in proportion to the thinness of the plate.

The transfer will also be proportioned to the rapidity of the circulation. Water is one of the poorest conductors of heat, and if a stratum next the plate remains in its position, so soon as it is heated to the temperature of the plate the transfer of heat ceases, or goes on with the slowness with which heat is conducted away by the water; but if the instant a particle of water is heated, it is replaced by the coldest one in the boiler, the transfer of heat goes on with the greatest possible rapidity. In plain kettles, heated from the bottom, the ebullition creates a very active circulation; but in small tubes, if the bubbles of steam are passing in one direction and the water in the opposite, the circulation is seriously impeded. Inclining the tubes, as in Dickerson's boiler, is an exceedingly simple and effectual means for producing the most active circulation, and is probably destined to be very generally adopted.

The most effectual plan, however, for insuring the transfer of all the surplus heat is to pass the products of combustion right into the water. This plan has been tried on a steamboat on the North River—the *John Faron*—but was abandoned in consequence of the accumulation of ashes in the boiler; it would seem, however, that this difficulty, being merely mechanical, ought to be overcome, in view of the great advantages to be realized. It is true that both the air and the fuel would require to be introduced against the pressure of the steam, but as the air would be worked through the cylinder, its expansive force would doubtless be sufficient to drive the air pump. Prof. Seely has suggested that the carbonic acid might be absorbed by the steam, so that no increased tension would result from it; but this certainly would not be the case with the nitrogen, and its expansion would at least prevent any loss of power. This plan would give not only the most effective and economical, but also the simplest and cheapest, of all conceivable boilers. All that would be required would be a plain cylinder with an inclosed fire-box, without any tubes, stays or other costly adjuncts; and, as no heat would pass through the shell, it might be of any thickness necessary to insure absolute safety from explosion.

All that is required to make this great improvement practicable is some simple and effectual plan for preventing ashes from going into the boiler, or for readily blowing them out after they are introduced.

STEAM PLOWING.

It takes a long time to effect some reforms. It is difficult to make mankind believe that there are ways better than they now walk in—methods more economical, and processes more speedy, than those now used. Some farmers still laugh to scorn agricultural machinery; and we know of one place where the proprietor of a shirt store displays the announcement, "no machines used," as if by so doing he could make the public believe that machine work was inferior. So it is with steam plowing in this country. There are those who are skeptical of its utility as well as economy, and who assert that while the machinery is being rigged up, the engine made ready, and the system in successful operation, a man could do as much with a team and a plow. By a parity of reasoning, we might say that while the team and plow were getting ready a man could spade up just as much, for it is in the increased amount of work that machines can accomplish over hand labor that the economy of it lies.

There may be some force in the views quoted, but it seems impossible to doubt but that steam cultivators can be introduced and successfully used here as elsewhere. In England they are standard machines; not merely to plow level turf and break up green sward, but to surmount reasonable acclivities; in short, on general rolling ground. Indeed, we are told by witnesses that in Fowler's system (English), where the plows are drawn over the field by a stationary engine, that they are frequently used when they are out of sight behind a hill top. In fact, the greatest competition exists in England for superiority in steam plows. There are now in operation no less than six different styles and plans; probably more, but of this number we are assured from the business circulars of the proprietors. In this country, for the best reason in the world—a lack of interest in it by the class to be benefited, the farmers—very little advance has been made. There is no reason in the world why, in certain parts of the country, steam cultivation should not be employed. We are not in favor of the English system for this country, for it seems to us that it would take so long to get the apparatus ready—it is so cumbrous and un-

wieldy—without a great force of laborers, as to render it unprofitable among our people, who like to see a thing go ahead from the beginning to the close, without stops to adjust tackle or take up anchors, and similar duties.

Our ideal of a steam plow is one that will march into the bowels of the land without impediment. Roper has shown us how a light traction engine can be built, if that is a desideratum, and it only remains to adapt it to cultivating the soil to render it useful. Whether it is best to draw the plows after the engine or to have them drawn over the field, is an open question. In England, however, the latter is the general plan. Mr. Elias Howe, Jr., of sewing-machine celebrity, has a steam plow which drives a row of cultivators similar in appearance to the arms of a pulley widened at the end. These cultivators are placed beneath the engine and are driven by it as it progresses. There are several other systems which, for want of space, we cannot describe; but we suggest that the present fall, when the agricultural fairs take place, that the presiding officers consider the subject thoroughly. At that time a multitude of farmers—capitalists, and others interested in agricultural machines—are gathered together and concerted action, favorable to the scheme, might be had, if ever.

A NOVEL PATENT CASE IN ENGLAND.

The English patent law provides that a patentee "may, if he thinks fit, enter with the clerk of patents a disclaimer of any part of either the title of the invention or of the specification;" the object being to amend a defective patent, substantially the same as is provided for in our law, which allows a patentee to obtain a reissue of a defective patent.

A very novel practice has been introduced into the English Patent Office, by the Solicitor-General, in a recent application for a disclaimer. It appears that one Medlock obtained a patent, in 1864, for a valuable method for preparing aniline dyes by treating aniline with dry arsenic acid, which patent was being extensively infringed by several large and wealthy companies. In a suit for intringement the Vice Chancellor had pronounced in favor of the validity of the patent; but on this point the Lord Chancellor overruled, on the ground that two alternative processes had been described in the specification, and that, confessedly, but one would answer. The assignees of the patent determined to enter a disclaimer of one of the processes. The application came before the Solicitor-General in due form, who, with the concurrence of the Attorney-General, decided to allow a disclaimer, provided the assignees would sign a stipulation not to prosecute nine companies, who were admitted infringers of the Medlock patent.

This, it strikes us, is a very extraordinary proceeding on the part of a law officer of the Crown, whose business it was, simply, either to grant or reject the disclaimer, without operating to deprive the assignees of their right to sue infringers. If the Commissioner of Patents at Washington should indulge in such sharp practices, we guarantee that he would not remain in the Patent Office very long afterward. Our Commissioner, it appears to us, has just as much right to negotiate with applicants for reissues that that they shall not sue infringers, as the Solicitor-General has, under the English law of disclaimers, to seek to shield such parties. It looks very much as though the Solicitor-General was acting in the double capacity of law officer and counsel for the infringers.

Working Early and Late.

A citizen of Woonsocket, Rhode Island, communicates to the Boston *Journal* a statement concerning the hours of daily labor in the factories of that region. He says:—"Many of the mills commenced in this way—first bell in the morning at 4½ o'clock; last bell at 5 o'clock, when all hands must be at work; ring out at 7 o'clock in the evening. The help then require about half an hour to get home, wash and get supper. They have half an hour, and in some cases three-quarter of an hour, for breakfast, and three-fourths of an hour for dinner." The actual labor and confinement in the mills are from twelve and a half to twelve and three-quarter hours.

Children of all ages, from ten years old and upward, are thus worked and confined in some of these mills.

PRINCIPAL ARTICLES OF TAXATION.

The last number of *Hunt's Merchants' Magazine* has a classified list of the tax on manufactures, reduced from the returns of the Commissioner of Internal Revenue for the year ending June 30, 1864. The following are the articles yielding the largest revenue:—

Articles.	Annual Tax.
Distilled spirits	$28,431,797 83
Tobacco (manufactures of)	7,086,684 74
Cotton goods	3,717,433 87
Leather	3,548,176 51
Iron manufactures	3,202,855 14
Fermented Liquors	2,223,719 73
Petroleum	2,201,573 20
Wood wares	1,679,940 25
Cotton (raw)	1,268,412 56
Sugar (raw)	1,267,616 28
Cigars	1,255,424 89
Paper and manufactures of	911,914 72
Sugar (refined)	873,139 85
Gas	714,740 13
Wool (manufactures of)	647,246 61
Coal	572,436 54
Confectionery	465,793 15

The total value of the manufactures in the loyal States for the year is estimated at $2,521,243,885.

NEW BOOKS AND PUBLICATIONS.

THE FIELD, TURF AND FARM is the title of a new and attractive illustrated journal recently issued by Messrs. S. D. & G. B. Bruce, No. 62 Liberty street, New York. It is full of interesting matter on subjects within its peculiar province.

QUARTZ OPERATOR'S HAND-BOOK.—For sale by booksellers generally. Price by mail, postage paid, $1 25. Address Wheeler & Randall, at the *Mining and Scientific Press* office, San Francisco. This is a work prepared for the use of prospectors, miners and mill men on their assay of ores to determine the purity, together with practical rules for different parts of machines.

ISSUED FROM THE UNITED STATES PATENT-OFFICE

FOR THE WEEK ENDING AUGUST 22, 1865.

Reported Officially for the Scientific American.

☞ 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.

49,489.—Mode of Attaching Sashes to Window Cords.—Henry J. Adams, Leavenworth, Kansas:

I claim the hook, C, in combination with the plate, B, constructed and operated substantially as and for the purpose specified.

49,490.—Washing Machine.—Joseph Adams, Janesville, Wis.:

First, The lever frame, B, provided with the pendant frame, C, having a roller, E, at its lower end, and slats, g, and springs, D, bearing against it, substantially as and for the purpose specified.

Second, The yielding concave slatted frame, F, in connection with the frames, B C, substantially as and for the purpose set forth.

Third, The yielding slatted bearing frame, H, in connection with the frames, B C, for the purpose specified.

Fourth, The combination of the lever frame, B, pendant frame, C, slatted concave frame, F, and bearing frame, H, all arranged in connection with the suds box, A, to operate substantially as and for the purpose set forth.

[This invention relates to a new and improved clothes-washing machine, of that class in which rollers are employed and a slatted bed. The object of the invention is to obtain a more efficient machine than others of the same class as now manufactured, and one which may be operated with less friction.]

49,491.—Breech-loading Fire-arm.—Ethan Allen, Worcester, Mass.:

First, I claim the combination with the hinged breech, D, of a horizontally moving locking lever, E, substantially as and for the purpose described.

Second, The combination with the rear of the locking lever, E, of a self-adjusting stop or piston, f, substantially as and for the purposes described.

49,492.—Tethering Apparatus.—S. L. Avery, Norwich, N. Y.:

I claim a tethering apparatus, made substantially in the manner and for the purpose herein set forth.

49,493.—Spittoon.—L. W. Barguet, New York City:

I claim a spittoon, the body of which is made of one piece of metal struck up into the form of a portion of a sphere, without seam or crevice, substantially as described and for the purpose set forth.

49,494.—Stove-pipe Thimble.—S. W. Bartholomew, Burr Oak, Mich.:

I claim the stove-pipe thimble, composed of the annular heads, A A, cylinders, B C, perforations, D E, lips, d e, and intermediate cylinder, F.

49,495.—Manufacture of Steel.—Julius Baur, New York City:

I claim combining metallic chromium with iron, for the purpose of producing or improving steel in crucibles, substantially in the manner set forth.

Second, Combining metallic chromium with iron, for the purpose of producing or improving steel made by the pneumatic process, substantially in the manner set forth.

Third, A triple compound of iron, carbon and chromium, substantially such as and for the purposes set forth.

49,496.—Apparatus for Removing Hair from Hides.—Mellen Bray, Boston, Mass.:

First, I claim a machine, organized for operation, substantially as described, for the automatic unhairing, striking, scouring and currying of hides or skins, in the manner herein set forth, the same consisting substantially of the combination of a revolving cylinder and helical blades, with a support for the hide or skin, substantially as set forth.

Second, I claim the construction of the revolving cylinder, substantially as and for operation hereinbefore described; that is to say, providing the same with a right and left-hand screw, substantially as set forth.

Third, I claim the combination of a revolving screw cylinder with a revolving drum, when the two are geared to move at relative velocities, in the manner and for the purpose substantially as set forth.

Fourth, In combination with a revolving screw cylinder and a revolving feed drum, I claim the pressure roller or their equivalents for holding the skins or hides to the drum, substantially as herein described.

Fifth, In combination with the revolving screw cylinder and revolving feed drum, I claim the arrangement for elevating and depressing the drum at pleasure, substantially as set forth.

Sixth, I claim combining with the arrangement for elevating the drum to, and depressing it from, the screw cylinder, a friction clutch or other coupling device, in such manner that by lifting the drum the operative parts shall be thrown into gear, while, by lowering it they shall be thrown out of gear, substantially as set forth.

49,497.—Harvesting Machine.—C. R. Brinckerhoff, Rochester, N. Y.:

First, I claim the bed frame, A, constructed as shown and described, having the hangers, h and h', for the support of the axial shaft, S, and the lugs, f and f', for the attachment of the reel posts, when the machine is to be used as a reaper.

Second, The detachable knee piece, k, having the projecting hanger arm, a, for the carrier wheel, w, and the stop, i, all in the manner shown, and for the purposes described.

49,498.—Clothes Dryer.—J. M. Butters, Lovel, Maine:

I claim the combination of the center post, A, bars, B, and standard, C, constructed and arranged in the manner substantially as and for the purpose specified.

49,499.—Vegetable Cutter.—John Caldwell, Sr., Chillicothe, Ohio:

I claim the arrangement of the plattorm, a, with its horizontal knife, h, and removable knife block, s r, the latter for optional use, in combination with the former, as described.

[This invention consists in inserting within the platform of the vegetable cutter over which the vegetables to be cut are passed, and in the direction of its length, a series of parallel vertical knives or blades, in connection with a horizontal transverse knife extending entirely across its width, in regard to which knife the platform can be adjusted at pleasure, so as to increase or decrease the opening between them.]

49,500.—Folding Table or Bench.—Rufus Carter, Jr., Lawrence, Mass.:

I claim the combination of the top, A, the plates, C, the legs, D, the roller, E, and braces, F, constructed substantially as herein set forth, for the purpose specified.

49,501.—Harvesting Machine.—Hewett Chandler, New Gloucester, Me.:

I claim the lip, c, on the axle, C, resting in recesses, d, in the blocks, e, and employed in combination with the lever, O, to throw the pinions, I i, in and out of gear, as explained.

[This invention relates to an improved mode of arranging or operating the sickle, whereby much friction is avoided, which generally attends the ordinary crank and connecting-rod mechanism most generally employed for a sickle-driving medium. It also consists in a novel and improved arrangement of parts for throwing the sickle-driving mechanism in and out of gear.]

49,502.—Process for Purifying Coal Oil, Etc.—Robt. A. Chesebrough, New York City:

I claim the use of bone black for purifying petroleum or coil oil for filtration.

49,503.—Oven for Cooking.—John Chilcott, Brooklyn, N. Y. Antedated Aug. 11, 1865:

I claim, First, The employment on all or several sides, under the bottom and over the top of an oven of a continous system of flues, substantially as herein described, through which the gaseous products of combustion from the fire pass back and forth several times in contact with the exterior of the oven before escaping to the chimney or up-take.

Second, The hollow partition, C', containing a series of flues, c c, forming part of the same continuous system with the flues at the top, bottom and sides of the oven, substantially as herein described

49,504.—Heater.—John Chilcott, Brooklyn, N. Y. Antedated Aug. 15, 1865:

I claim, First, Surrounding the air-heating chamber of a stove or furnace with a continuous system of flues, b b, substantially as herein described, in which the gaseous products of combustion are caused to circulate continuously twice or more times around the said chamber before passing to the chimney, substantially as herein set forth.

Second, In combination with the continuous system of flues, b, surrounding the sides of the air-heating chamber, I claim the continuous system of flues, c j k l m', under, through the interior of, and above the said chamber, substantially as herein described.

49,505.—Apparatus for Making Illuminating Gas.—Owen Collins, New York City:

I claim, First, Constructing or providing an apparatus for making illuminating gas from liquid substances with an annular evaporator, B, surrounding the furnace, substantially as herein specified.

Second, The annular retort, F, having a conical bottom and top, as herein specified.

Third, The combination and arrangement of the cylindrical annular evaporator, B, the conical annular retort, F, the deflector, L and L2, and the cylinder, V, substantially as herein specified.

49,506.—Harvesting Machine.—John S. Davis, Tiffin, Ohio:

I claim, First, Securing the finger-beam of the cutting apparatus to the hinged tongue or draft pole of the machine, substantially as described.

Second, Adapting a hinged draft pole or tongue to serve as a support and means of attachment for the cutting apparatus of a harvesting machine, substantially as described.

Third, Hinging the tongue to the machine in such a manner that it is allowed to oscillate laterally, and admit of the rising and falling motions of the outer edge of the cutting apparatus, substantially as described.

Fourth, Providing for sustaining the tongue, G, at its rear end in an elevated position, in combination with the contrivances adapted for elevating and lowering said tongue, substantially as described.

Fifth, Extending the rear portion of the tongue, G, beneath the axle, B, in combination with hinging this tongue to the platform, C, substantially as described.

Sixth, The combination of the laterally oscillating tongue, G, and plate, E, with the hinged platform, C, substantially as described.

Seventh, Sustaining the forward end of the crank shaft, C', by means of the platform, C, and its rear end by means of the rear extension of the tongue, G, substantially as described.

Eighth, The segment, o, applied to a rocking tongue, G, substantially as described.

Ninth, The friction roller, S, applied to an oscillating tongue, G substantially as described.

Tenth, The articulating platform, C, applied between the axle, B, and laterally oscillating tongue, G, substantially as and for the purpose described

Eleventh, Supporting the crank shaft, C', of a harvesting machine in oscillating bearings, and arranging these bearings in such a manner that the tongue is free to move up or down at its rear, and also to operate laterally without cramping the crank shaft or its drawing gear, substantially as described.

Twelfth, Interposing a wedge, w, between the inner extension, F', of the finger-beam and the tongue, G, for the purpose substantially as described.

49,507.—Jack Spools.—Daniel R. Day and John G. Folsom, Winchendon, Mass.:

We claim the hard wood plugs, a a, put into the shaft, A, in combination with the screw-cap flange, C, outside plate, E, and journals, F f, as herein described, for the purposes set forth.

49,508.—Railway Car.—Elias Hasket Derby, Boston, Mass., and True West, Roxbury, Mass.:

We claim the railway carriage as constructed with the niche or recess, B, in either or each of its ends, and with steps, d d, and hand holders, c c, arranged within or applied to such recess, substantially as and for the purpose described.

We also claim the combination of the seat, c, in the recess or at its base, with such recess, and the series of steps and hand holders when applied together and to a railway carriage, substantially as described.

We also claim the combination and arrangement of the hatchway, or the same, and its hatch or door in the roof, with the niche or recess, its steps and hand holders, arranged in the body of the carriage substantially as stated.

49,509.—Composition for Lining Journal Boxes, Etc.—Patrick S. Devlan, Jersey City, N. J.:

I claim the compound substantially as herein described, consisting of prepared lime, plumbago, silicate of soda or potassa, and fibrous substance, whether vegetable, animal or mineral, as described.

49,510.—Railway Car Track.—Davis H. Dotlerer, Philadelphia, Pa.:

I claim the combination of beams, B and D, trussed braces, E E, and vertically-adjustable suspension rods, g g, substantially as described.

49,511.—Hinge.—Samuel R. Dummer, New York City:

I claim the hinge bolt, g, constructed and applied substantially as and for the purposes set forth.

49,512.—Cultivator.—G. Ekstrand and A. P. Cassel, Wataga, Ill.:

We claim the adjustable bar, G, having the plow beams, I I L L, connected to it by the bars, P R, and the bars, R, connected at their upper ends by a bar, S, all being arranged and applied to a mounted framing, to operate in the manner substantially as and for the purpose set forth.

[This invention relates to a new and improved cultivator, of that class in which laterally adjustable plows are used, in order that the plows may, while the device is at work, be moved to conform to the sinuosities of the rows of plants.]

49,513.—Earth Pulverizer.—William Elwell, Gardiner, Maine:

I claim the angular strips, D, constructed and arranged substantially as described, in combination with a suitable machine that will admit their application in the manner and for the purposes herein specified.

[This invention consists in securing on the bottom of a drag, or other suitable device or machine having a flat bottom, a number of triangular-shaped strips—either metal or wood—which, while the machine is being drawn along, will strike against the lumps of earth and pulverize the same, as well as cover seed after it has been sown.]

49,514.—Center Board.—George M. Fay, Eureka, Cal.:

I claim the combination of the center board, A, constructed with a shoulder or projecting end, e, the parallel bars, B B, and the case, c, within which the board fits, all constructed and arranged to operate as specified.

[This invention consists in the application of two parallel hinged bars to a center board in such a manner that said center board rises and falls parallel, and when it is lowered the full width of the center board is brought into action.]

49,515.—Candy Cigar Machine.—Henry Geilhausen, New York City:

I claim the end cutter, c, applied in combination with the rollers, B B, which are provided with cavities, a, and with the feed table, D, substantially as and for the purpose set forth.

[This invention consists in the use of two rollers, each of which is provided with a series of semi-cylindrical cavities or flutes, each representing the shape of one half of a candy cigar, in combination with a suitable feed table, and with end cutters working in annular grooves in both ends of the rollers in such a manner that by gearing the two rollers together, and feeding the candy paste through between them, a large number of candy cigars are produced in a short time, all perfectly uniform, and in the proper shape.]

49,516.—Wood-turning Lathe.—R. W. George, Boston, Mass.:

I claim, First, The yielding friction clamps or springs, arranged around the bore or axis of the lathe head for the purpose of rotating the rounded stock as it is forced through the head against the cutter or cutters, substantially as described.

Second, The intermittent or reciprocating feed plate, E, and pattern, z, in combination with the sliding cutter or cutters, i, and lathe head, V V, constructed and operating substantially as described.

Third, The hinged plate, A', provided with one or more adjustable cutters, J, in combination with the cam, l, intermittent or reciprocating feed plate, E, and lathe head, V V', substantially as set forth and for the purpose described.

Fourth, the combination and arrangement of the hopper, D, hollow auger, Q, lathe head, V V, and self-adjusting cutters, i and j, substantially as set forth and for the purpose described.

49,517.—Tinman's Furnace.—Eli B. Gibbud, Waterbury, Conn.:

I claim the furnace, in combination with the copper, D, when they are constructed, arranged and fitted for use, substantially as herein described.

49,518.—Method of Utilizing Waste Whiting.—Henry W. Gray, Camden, N. J., assignor to Anthony Gunther, Philadelphia, Pa.:

I claim the use and application of the refuse of whiting that has been used in the process of making mineral water, substantially as herein set forth.

49,519.—Washing Machine Wringer.—John T. Hagerty, Camp Point, Ill.:

I claim suspending the arms, G, with the bed of concave rollers, E, by four or more elastic springs, H, as herein described and for the purposes set forth.

49,520.—Sheep Rack.—G. J. Hendricks, Paris, Pa.:

I claim a sheep-feeding rack constructed with one or more troughs, B' B', on its outside, said troughs being hinged by arms, b' b', so as to be adjusted to the positions shown in Figs. 3 and 4 of the drawings, substantially as and for the purpose set forth.

49,521.—Potato Digger.—J. J. Hill, Xenia, Ohio:

I claim, First, The combination of the roller, E, with the shovel, F, operating in the manner described, and for the purpose set forth.

Second, The combination of roller, E, and shovel, F, with grated shovel, G, toothed cylinder, I, and receiving box, J, operating conjointly in the manner substantially as described, and for the purpose set forth.

49,522.—Funnel.—John Q. Hill, Worcester, Mass.:

I claim the parts, A B C and D, in combination with each other and the removable strainer, s, substantially as shown and described.

49,523.—Revolving Cartridge Box.—Charles Howlett, Manchester, Conn.:

I claim the construction of the tubular receptacles formed by the radial ribs, E E, with their elastic strips, F, arranged with the raised tube, B, and shut-off, C, substantially as described and for the purposes set forth

49,524.—Machine for Cutting Threads on Bolts.—W. W. Hubbard, Philadelphia, Pa.:

I claim the weight, M, or its equivalent, combined with the carriage, I, and head, C, with its levers and cutters, so that the carriage shall be moved away from the head as soon as the cutters are raised from the bolt, substantially as described.

Second, The screw-cutting dies, P, connected to the levers, D, and rendered adjustable thereon by the key, s, gib, r, and set screw, h, as set forth.

Third, The adjustable holder, N, its recesses, u, and set screws, m and n', the whole being constructed and arranged as set forth.

49,525.—Adjustable Fastening for a Reflector.—S. D. Ingram, Harrisburg, Pa.:

I claim a compound adjustable reflector for lights, consisting of the arm, D, carrying the reflector, E, having a vertical movement through slide, c, and a horizontal one along arm, A, constructed and operating in the manner set forth.

49,526.—Apparatus for Carbureting Air.—John H. Irwin, Chicago, Ill.:

First, I claim the arrangement of an engine or machine operated by heated air, with an air pump or other device for producing a current of air, and a carbureting apparatus, arranged and operating substantially as and for the purposes specified and shown.

Second, I claim, in combination with the carbureter, the employment of an engine or machine operated by heated air produced by the combination of carbureted air, and a suitable device for producing a current of air through the carbureter, arranged and operating substantially as shown and described.

49,527.—Faucet.—Nathaniel Jenkins, Boston, Mass.:

I claim the compressible, elastic body, E, in combination with the valve seat, L, cap, D, and valve lifter, F, of a faucet, the said body being so constructed and arranged as to answer the three-fold purposes of a spring, a packing for the cap, and a valve, substantially as described.

49,528.—Artificial Leg.—George B. Jewett, Salem, Mass.:

I claim the combination and arrangement of the hanger, g, and the two struts or posts, h h, with the thigh socket frame, A, and the leg bar or column, B.

I also claim the combination and arrangement of the knee-piece or block, b, with the thigh socket frame, the hanger, g, and the two struts, h h.

I also claim the arrangement of the cushion, d, and the flut base, c, or its equivalent, with the column, B, the thigh socket frame, A, the hanger, g, and the struts, h h, the whole being substantially as specified.

49,529.—Artificial Leg.—George B. Jewett, Salem, Mass.:

I claim the improved ankle joint, made with the screw pin, K, its holding standards, h h, encompassing tube, G, and the oil chamber, arranged within the pin and provided with a discharging opening, h, as explained.

I also claim the combination and arrangement of the cap screw, e, with the ankle joint as constructed, substantially as hereinbefore described.

I also claim the combination of the shoulder or flange, c, with the auxiliary socket, C.

I also claim the combination of the raised projection of the top of the rigid socket with the auxiliary socket and its flange or shoulder, the same being for the purpose explained.

I also claim the construction of the auxiliary socket, C, with the opening, a, or the same and the tongue, b, arranged as set forth.

I also claim the auxiliary or soft socket, as made with the shoulder or flange, c, the opening, a, and the flap or tongue, b, arranged substantially as described.

49,530.—Harvester Rake.—J. Herva Jones, Rockton, Ill.:

I claim, First, The combination of the jointed rake stale, the link rod or pitman, and the cam guide, substantially in the manner described, for the purpose of causing the rake to traverse in a path the counterpart of the cam groove, as set forth.

Second, The stop, c, arranged and operating substantially as described.

Third, The combination with the arms, B C, of a spring, b, substantially as and for the purpose described.

49,531.—Photographic Printing Frame.—Samuel K. Jones, New Haven, Conn.:

I claim the spring frame, D, and intermediate bands, c c, in combination with the board, C, substantially as herein described, and for the purpose set forth.

49,532.—Bolt Machine.—Edward Kaylor, Pittsburgh, Pa.:

I claim the use in bolt machines of the detached cutters, m m', placed in front of, and susceptible of adjustment to and from the face of the griping dies, in combination with the screw, o, and slide, v, for adjusting the lower cutter, and the lever, k, and loop, t, for operating and adjusting the upper cutter, substantially as described, for the purpose of cutting off the blank to make any desired length of bolt, without requiring any change of the dies.

49,533.—Thrashing Machine.—Benjamin H. Kepner, Nora, Ill.:

I claim the combination and arrangement of the parts, 5 and 6, for hulling and cleaning cloverseed, with the parts, 1 2 3 and 4, of a grain thresher and straw separator, parts 2 and 4 and 5 and 6 being interchangeable, to constitute a convertible machine, which may be readily and economically adapted to either purpose, said parts being arranged and operating substantially as set forth.

I also claim the combination and arrangement of the boards, q and s, of the feed board, O, and transverse, inclined board, S, with the cylinder, A, operating substantially as and for the purposes specified.

49,534.—Sorghum Evaporator.—Joel Kindley, Oskaloosa, Iowa:

I claim the divisions, D, which are moved in the manner and for the purpose described consecutively along the pan and out at open end.

49,535.—Hook.—William M. Knight and Jonathan H. Orne, Marblehead, Mass.:

We claim the application to a common hook of a spring which will allow the hook easily to pass into the staple, but will prevent it from being withdrawn therefrom without the application of lateral pressure upon the spring, substantially as herein described.

49,536.—Railroad Switch.—Ezra B. Lake, Bridgeport, N. J.:

I claim the levers, E E', block, F, and arms, H H, connected by the bar, G, all arranged in connection with the switch and the rails of the branch and main tracks, to operate in the manner substantially as and for the purpose set forth.

[This invention relates to a new and improved self-acting switch for railroads, and it consists in a novel construction and arrangement of the same, whereby the switch may be operated by the locomotive when in motion, and all casual or accidental moving of the switch prevented.]

49,537.—Manufacture of Flour Cloths.—Charles L. Laurence, New York City:

I claim the combination, by the process hereinbefore detailed, of india-rubber and cork dust; also the use of the horizontal quick-running iron or hard wood rolls, as above described, in the said process; also the attachment to the shoe s of compound of the fabric above mentioned to the surfaces thereof; and also the application of the steam and fire heat to the sheets in the process above described.

49,538.—Machine for Washing Bottles.—John Matthews, Jr., New York City:

First, I claim the combination of the stationary base, A, having an attached water pipe and nozzle, g, and the vibrating frame, C, carrying a receptacle, E, for the bottle, and having connected with it a device for opening and closing the said water pipe, the whole operating substantially as herein specified.

Second, The combination of the fixed nozzle, g, and the movable cup, E, having an attached tube, F, and fixtures, a, substantially as herein described.

Third, The elastic tube, B, spring, m, and cross-piece, q, in combination with the base, A, and vibrating frame, C, substantially as and for the purpose herein set forth.

Fourth, The combination with the base, A, vibrating frame, C, cross-piece, q, movable spring, m, and adjustable set screw, D, of the two or more tapped cross-bars, k1 k2 k3, and cups, n1 n2 n3, substantially as and for the purpose herein specified.

49,539.—Combined Rotating Fountain and Seat for Barbers' Shops.—John Mayer, Philadelphia, Pa.:

First, I claim the fixed central fountain or isolated stand, A, the same being constructed substantially in the inverted top form shown, and also provided with the recesses, a', basins, a2, water supply spouts, a4, connecting with supply pipes passing up through the stand to the same, and the waste pipes passing down through the stand from the said basins, all as described and set forth, for the purpose specified.

Second, I also claim the combined arrangement of a stationary central fountain, A, with a rotary platform, B, provided with radially-moving seats, D, the whole being constructed so as to operate together substantially in the manner described and set forth, for the purposes specified.

49,540.—Cultivator.—Ezra McEwen, New Lisbon, Ill.:

First, I claim the combination and arrangement of the draft pole, E, the plow beams, a a, the cross-bar, b, provided with the slots, b b, cross-bar, c, beams, d d, shares, m n, and handles, as and for the purposes specified.

Second, I claim the combination and arrangement of the plow beams, a a, cross bar, b, slotted, as shown, handles, h, connecting strips, e e, and shares, m n, as shown in Fig. 3, substantially as shown and set forth.

49,541.—Sash Supporter.—W. C. McGill, Cincinnati, Ohio:

I claim a friction roller made of rubber or other elastic substance, in combination with screw bolt, D, and movable plate, G, and frame, F, to regulate the same at will, operating as and for the purpose specified.

49,542.—Match Igniter.—John H. Merrill, Norwalk, Conn.:

I claim as an improved article of manufacture a match igniter, made as herein described.

[The object of this invention is to provide a roughened surface for the ignition of matches, so made that the surface will not become spoiled or smoothed by use. The material of which the match igniter is composed consists of clay and sand; these ingredients are mixed in equal parts, with water, and then fashioned or molded, like pottery or earthern ware, into any desired form, and then baked in an oven.]

49,543.—Baggage Check.—James Murdock and Wm. W. Spencer, Cincinnati, Ohio:

We claim First, The mode of forming a baggage check by stamping or engraving both faces on one side of a single strip, A, of metal, which is then beat backward upon its obverse surfaces, and secured by rivet, B, or its equivalent, substantially as set forth.

Second, The baggage check, composed of the reflexed double-faced strip, A, and strap, C, both secured by the same rivet or rivets, substantially as set forth.

49,544.—Packing for Oil-well Tubes.—C. L. Noe, Bergen Point, N. J.:

First, The two flanges, a b, with the pins and holes therein contained, or their equivalents, in combination with the cord, e e, and the two leather cylinders, with a stuffing contained between them, operating and for the purpose substantially as herein described.

Second, The application and arrangement of the cord or rope, j j, and eyes, i i, with the seed bag, as herein described.

49,545.—Carriage Spring.—H. H. Olds, New Haven, Conn.:

I claim a spring, composed of cross arms, A A, hinged caps, B, and elastic blocks, D, connected together substantially in the manner and for the purposes set forth.

[This invention consists in the use of two cross arms, provided at their ends with hinged caps, which inclose blocks of india-rubber or other elastic material, and which are connected by longitudinal rails in such a manner by placing a weight upon said rails, or by subjecting the same to a pressure of any description, the elastic blocks are compressed between the caps and the edges of the rails, and a spring is obtained which is strong and durable and has considerable play, with a proportionably small quantity of elastic material.]

49,546.—Sheet-metal Boiler.—Andrew O. Neill, Portsmouth, Ohio:

I claim a sheet-metal boiling vessel, whose bottom is struck or stamped with a pit or drop, a seamless shoulder and an elevated margin.

49,547.—Cultivator.—John G. Page, Rockford, Ill.:

First, I claim, in combination with a cultivating machine for cultivating two rows, the employment of the two shaft poles, D D, arranged and operating substantially as and for the purposes herein specified and shown.

Second, I claim, in combination with a cultivator, arranged so as to cultivate two rows at once, the arrangement of two semicircles, M M, the connecting bar, N, or its equivalent, and the front share standards, J', operating substantially as and for the purposes specified.

Third, I claim the arrangement of the latch, R, with the rod, m, and arc, E, as and for the purposes shown and set forth.

Fourth, I claim the arrangement of the lever, l, with the latch, R, and rod, m', operating to release the forward plows when they are raised from the ground, substantially as shown.

Fifth, I claim the arrangement of the long neck yoke, D, with the two poles, D, as and for the purposes specified.

49,548.—Bomb-lance for Killing Whales.—Ebenezer Pierce, Hallowell, Me.:

I claim an apparatus for fastening two irons to a whale at one operation, consisting of the bomb-lance, E, in combination with a harpoon or other iron, D, operating substantially as set forth.

Second, I also claim a rod or rods, w, in combination with the staff, p, of the bomb, operating in the manner and for the purpose set forth.

49,549.—Manufacture of Friction Matches.—Van Rensselaer Powell, Troy, N. Y.:

I claim as a new article of manufacture the friction-match strips, the same substantially as herein described.

49,550.—Churn and Butter-worker Combined.—Joshua Randall, Grand Rapids, Mich.:

I claim the use of the two dashers, h and l, made of the form and operated in the manner described.

I also claim the use of the friction guiding roller, a', arranged with regard to the dasher rods, as described.

49,551.—Thrashing Machine.—Henry Read, Ypsilanti, Mich.:

I claim the application to the feed boxes or hoppers of thrashing and other analogous machines of a recess or chamber arranged relatively with the toothed cylinder of the machine, to operate substantially in the manner as and for the purpose herein set forth.

49,552.—Adjustable Thill.—Wm. P. Robinson, Brimfield, Ill.:

I claim the combination of the thills, A B, and cross bar, C, pivoted together at c c, with the arcs, E F, perforated as described, and the removable pins, m n, arranged and operating substantially as and for the purposes herein shown and described.

49,553.—Adjustable Center Punch.—E. E. Safford and Sylvanus Sawyer, Fitchburg, Mass.:

First, We claim the combination of the adjustable stock, A, with the extension bar, B.

Second, The combination of the indicator, C, with the stock, A, and the extension bar, B.

Third, We also claim combining the center punch, F, with the extension bar, B, the indicator, C, and the stock, A, the whole being arranged and operating substantially in the manner herein described and set forth.

49,554.—Straw Cutter.—W. D. Schooley, Richmond, Ind.:

First, I claim the rod, a, with its handle, g, the lever, c, with its attachments, cam rod, b, and its connections, and the connecting rod, f, all arranged and operating as described.

Second, The combination of the rod, a, lever, c, connecting lever, f, and feed roller ratchet wheels, d and e.

Third, The combination of the rod, a, lever, c, cam rod, b, and feed rollers, E and I, as set forth.

Fourth, The combination of ratchet wheels, d and e, the connecting lever, f, lever, c, and rod, a, for the purpose of holding the feed during the cut of the knife.

49,555.—Rose Engine for Ornamenting Glass.—Anton Schwitter, New York City:

I claim the use of a hinged tool holder, in combination with the slide, A, or its equivalent, fitting into the rest of a rose engine, or equivalent mechanism, constructed and operating substantially as and for the purpose set forth.

49,556.—Steam Generator.—Henry C. Sergeant, Columbus, Ohio:

I claim, First, The combination of the metal cylinder or casing around the fire surface, with the fire-box, and a reservoir for a body of water upon the crown sheet.

Second, I also claim the combination of the fire-flue and casing around it, when so arranged as to receive water from the reservoir on the crown sheet and convey it upward in contact with the flue.

49,557.—Seeding Machine.—John Shafer, Sparta, N. Y.:

I claim, First, The combination of the leveler, D, rear supporting wheel, g, and covers, n n', arranged substantially as described.

Second, Mounting the wheel, H, in a frame, G, which is hinged at points coinciding with the axis of the seed cylinder, b, in combination with the driving chain, d', or its equivalent, substantially as described.

Third, The spring-brake lever, J, applied to the handles of the machine, in combination with the swinging roller frame, G, substantially as described.

49,558.—Eraser and Burnisher.—A. G. Shaver, New Haven, Conn.:

I claim, in combination with the blade and handle of an eraser or desk-knife, a ferrule of steel, or any equally suitable metallic or mineral substance, constructed substantially as described, so that it may be used as a burnisher, as set forth.

49,559.—Combined Eraser and Burnisher.—A. G. Shaver, New Haven, Conn.:

I claim, in combination with the blade or handle of an eraser or desk-knife, the metallic or mineral boss, button or bolster burnisher, substantially as described.

49,560.—Car Spring.—Thomas Shaw, Philadelphia, Pa.:

I claim the employment of cork in the manner and for the purpose set forth.

49,561.—Liquid Soap.—William Sheppard, New York City:

I claim liquid soap, made by mixing common soap and hartshorn together, substantially as and for the purpose set forth.

[This invention is based on the discovery that by the addition of a comparatively small quantity of common soap a large quantity of spirits of ammonia or hartshorn is thickened to the consistence of molasses, and a liquid soap is obtained of superior detergent properties.]

49,562.—Brick Machine.—Samuel Shreffler, Joliot, Ill.:

I claim, First, The combination of the pressing part, I, and mixers, E, with the shaft, H, when operated by means of the device that is attached to the cross bar, B.

Second, The combination of the spring, G, with the shaft, H, and mixing-box, A, substantially as described and set forth.

49,563.—Bee-hive.—A. J. Smith, Wayland, Mich.:

I claim the door, composed of three slides or parts, b c c, arranged substantially as set forth.

[This invention consists in providing the hive with a supplemental bottom of wire or other material, constructed as a screw, and placed above a close bottom, whereby the hive may be kept in a perfectly clean condition, moth excluded, and be perfectly ventilated.]

49,564.—Gang Plow.—Henry Smyth, New Lorenzo, Cal.:

I claim the construction of the eccentrical shaft or axle in two parts, so as to be able to raise or lower one wheel without interfering with the other, and the arrangement of the cog wheel attached to the eccentrical shaft or axle to raise or lower the body of the plow, together with the plow shears, by means of the wheel or endless screw, and their combined arrangement for manufacturing gang plows.

49,565.—Furnace for Puddling Iron.—N. S. Snedeker, Philadelphia, Pa.:

First, I claim arranging the fire chamber in heating or puddling furnaces, on two sides of the bottom, so that the flame from the fire is caused to act simultaneously on more than one side of the iron which is to be heated or puddled, substantially as shown and described.

Second, Giving the front end of the bottom, F, an angular form, so that the iron to be heated or puddled, when placed thereon, is caused to present more than one side to the direct action of the flame, substantially as shown and described.

Third, The arrangement of the stock hole, I, in combination with the fire chamber, H H, the angular bottom, F, the angular bridge, G, the charging door or doors, K, and the tapering sides, C D, in the manner and for the purpose substantially as shown and described.

Fourth, The combination of the charging door, K, with the angular bottom, F, these parts being constructed, and arranged and operating substantially as shown and described.

49,566.—Mop Head.—Wm. W. Spaulding, Galesburg, Ill.:

I claim the combination of the rod, B, with head, C, and sliding head, F, and the handle, A, when the parts are arranged in the manner as set forth.

49,567.—Composition for Coating Ships' Bottoms.—C. M. Spooner, New Bedford, Mass.:

I claim the said composition, made of the ingredients and in the manner substantially as described.

49,568.—Bedstead.—Andrew Stark, Topeka, Kansas:

I claim the combination of the hinged bed portion, a, hollow base, e e, the two-part foot-board, l m, and the double-hinged side pieces, s f, when arranged in the manner and for the purposes herein described.

[This invention relates to certain new and useful improvements in the construction and arrangement of a bedstead, so that when not in use it can be folded or brought into a compact form, and thus occupy but a small portion of the floor of the room in which it is placed; it being constructed in such a manner that when so folded it shall present a neat, tasty and pleasing exterior, without in the least impairing the appearance of the room, but, on the contrary, being an ornament to it.]

49,569.—Composition for Preventing and Removing Incrustation from Boilers.—Alonzo Temple, Bridgeport, Conn.:

I claim the within-described composition, made substantially as described.

[It is said that the effect of this composition when placed within steam boilers is to remove any deposit of scale or incrustation that may have been formed therein; also, to prevent the formation of new scale. The presence of the composition is also said to prevent the corrosion of the boiler.]

49,570.—Hat.—Wm. H. Towers, New York City:

I claim a hat, ventilated through spaces former at the back and front, by irregular enlargements of the circle or ovoid, substantially as described.

49,571.—Curtain Fixture.—H. H. Trenor, New York City:

First, I claim a window-shade fixture, composed of one or more plates, so shaped or combined as to inclose the pulley on the end of the curtain or shade roller, and so as to give bearings to its axle at each side thereof, and to form a guard against the cord slipping off, in combination with the direct or indirect means of attachment, as herein described.

Second, In combination with the above I claim forming an enlargement on the end of the pin or axle of the roller and pulley, and similarly shaping its bearings in the plate, for the purpose of preventing the roller slipping out of the fixture.

Third, In combination with a fixture inclosing the pulley, as described, I claim the double dovetail attachment, when constructed and arranged for operation substantially as herein set forth.

49,572.—Mode of Cutting Soles for Boots and Shoes.—J. H. Walker, Worcester, Mass.:

First, I claim cutting up sides of leather into soles for boots and shoes, in the manner described and as shown on sheet 1 of the accompanying drawings.

Second, Determining the true position of the die to commence cutting the second series of soles, in the manner described.

49,573.—Cooler for Brewers.—Chas. R. M. Wall, Brooklyn, N. Y.:

First, I claim the use of cores, I, substantially such as herein described, in combination with the refrigerating pipes, B, for the purpose set forth.

Second, Securing the refrigerating pipes at one end only, leaving the other end free to expand and contract, as specified.

Third, The longitudinal pipe, D, with one or more plugs, F, and the compartment, G, with one or more gates, H, in combination with the pipes, B B' B'', and vat, A, constructed and operating as and for the purpose described.

49,574.—Switches for Railroads.—David Warren, Gettysburg, Pa.:

I claim the employment of the rails, B and C, constructed as specified, and used with the rails, A A, and for the purpose herein set forth.

49,575.—Working Power for Sawing.—Ames West, Pontiac, Mich..

I claim, in combination with the crank pin, K, the lever, L, pivoted to said crank pin, and supported on the stationary pin, a, which passes through the slot, b, of said lever, as and for the purposes specified.

49,576.—Apparatus for Stripping Sorghum.—Richard C. Wilcox, Guilford, Conn.

I claim the guide spring, m, in combination with the stripping springs, a b c d, all operating as and for the purpose set forth.

49,577.—Instrument for Stripping Sugar Cane.—L. R. Witherell, Galesburg, Ill.:

I claim the standard, A, provided with the slot, a, in combination with the notched wheel, C, and blade, E, all arranged to operate in the manner substantially as and for the purpose set forth.

[This invention consists in the employment or use of a notched wheel, in connection with a yielding blade and a fixed standard, whereby the leaves may be stripped from the stalks of sorghum or Chinese sugar cane with the greatest facility.]

49,578.—Water Wheel.—C. D. Wright, Leesville, Conn.:

I claim the buckets, C, formed of a section of a cylinder, with the ends flaring from the bottom, and connected to the arms, B, by the flanges, a, all substantially as shown and described.

[This invention relates to an iron water wheel, which actually combines the direct and reacting effect of the water to the same as it strikes and leaves the wheel. The buckets are made in the form of a square disk, with flaring sides and a curved bottom, and they are fastened to the arms by means of flanges, which are made solid with, or otherwise attached to, the ends of the arms, and the hub is cast with the shaft hole and the arms in it, so that a cheap and durable wheel can be produced, and that by the peculiar form of the buckets the water acts in a direct way with great advantage; and, furthermore, a reacting force of the valve on the periphery of the wheel is obtained.]

49,579.—Elevating Crane.—J. T. Wright, Nashua, N. H.:

I claim the combination for or raising or lowering the pulley, o, the same consisting of the rope, E, the pulleys, l m d e f p, the rack, F, and the train of gears, r s t u v w and x, applied to the four shafts, y z a' b', the whole being arranged as set forth.

I also claim the combination for operating the pulley carriage, B, the same consisting of the rack, C, the train of gears, d' e' f' g' and h', applied to the shafts, i' k' l', the sprocket wheels, n' o', and chain, p', the whole being arranged substantially as hereinbefore explained.

49,580.—Trace Buckle.—Wilson Wyckoff, Chagrin Falls, Ohio:

I claim the loop, A, with the shoulder, a', and opening, a, bail, D, and tongue, f, when constructed and arranged substantially as and for the purpose set forth.

49,581.—Sheet-metal Gridiron.—George Booth (assignor to Porter & Booth), Philadelphia, Pa.:

I claim, as an improved article of manufactnre, a sheet-metal gridiron, having its bars and its head and tail rests constructed in one piece of the sheet metal, substantially as and for the purposes specified.

49,582.—Machine for Winding Conical Bobbins.—George S. Bradford (assignor to himself and Clark Tompkins), Bennington, Vt.:

I claim the combination of a conical roller, D, with a prostrate conical bobbin, A, and bobbin spindle, B, revolved by a rotary sleeve or collar, C, and pressed endwise toward the said conical roller by a weighted lever, E, or its equivalent, substantially as herein described.

I also claim mounting the conical roller on a pivot or axis, F, substantially as and for the purpose herein set forth.

49,583.—Breech-loading Fire-arm.—Lewis Wells Broadwell, New Orleans, La., assignor to C. M. Clay, Ky.:

I claim, First, The combination of the sliding breech block, b, and screw shank, b', constructed substantially as described, with the horizontally vibrating trigger guard, d, and rest, c.

I also claim the mechanism for preventing the premature discharge of the gun, as herein described and illustrated by the drawings.

49,584.—Journal Box.—William H. Doane (assignor to himself and I. A. Fay & Co.), Cincinnati, Ohio:

I claim, First, A journal box which is constructed with end chambers, b b, and a channel or groove, c, extending lengthwise through the box, substantially as described.

Second, The channels, c c, in combination with the end chambers, b b, and channels, c' c', in the cap, B, substantially as described.

Third, Providing for conducting the oil from the journal, C, back into the chambers, b b, at the extremities of the journal box, substantially as described.

49,585.—Electro-magnetic Telegraph.—Bobert Boyle (assignor to himself and Guiseppe Tagliabue), New York City.

I claim, First, The alphabet disk, A, in combination with the revolving traversing paper cylinder, D, and punch, F, constructed and operating substantially as and for the purpose described.

Second, So arranging the perforations in the paper that each of them, by its peculiar position in relation to the perforation representing the starting point of the message, and to the preceding and succeeding perforations, which position is governed by the revolving and traversing motion of the paper cylinder, or by any other equivalent means, represents a specific letter or sign, substantially as and for the purposes set forth.

Third, The combination of the screw spindle, C', and spring, C, with the revolving metallic cylinder, B', and perforated paper containing the message to be transmitted, substantially as and for the purpose set forth.

Fourth, The electro-magnet, F', and stop pawl, k', in combination with the cylinder, B', carrying the perforated paper, and with the spring, l', constructed and operating substantially as and for the purpose specified.

Fifth, The division wheel, G', constructed as described, in combination with springs, q q* q' q'* q'' q''*, paper cylinder, B', electro-magnets, A'' and horseshoe magnet, B'', constructed and operating substantially as and for the purpose specified.

Sixth, The combination of the electro-magnet, A'', and horse-shoe magnet, B'', with the clock movement of the receiving instrument, constructed and operating substantialy as and for the purpose herein specified.

Seventh, The forked arm, a2, and escapement wheel, b2, in combination with the oscillating horseshoe magnet, B'', type wheel, D'', and clock movement, C'', constructed and operating substantially as and for the purpose herein described.

Eighth, The sleeve, c2, carrying the escapement wheel, b2, and hair spring, d2, in combination with type-wheel shaft, f2, wheel, g2, pinion, i2, crown wheel, y2, and oscillating fork, a2, constructed and operating substantially as and for the purpose described.

Ninth, The method, substantially as herein described, of regulating the motion of the type wheel by means of a clock work and of an escapement wheel, to which motion is imparted by a hair spring, substantially as set forth.

Tenth, The combination of the sharp-pointed types with the type wheel, D'', and with the printing mechanism, constructed and operating substantially as and for the purpose set forth.

Eleventh, The escapement wheel, J2, and electro-magnet, K2, in combination with the dog, t2, arm, w2, spring, y2, and printing block, F2, constructed and operating substantially as and for the purpose set forth.

Twelfth, The combination of the oscillating horse-shoe magnet, B'', electro-magnet, K2, escapement wheel, J2, type wheel, D'', and printing block, F2, constructed and operating substantially as and for the purpose described.

Thirteenth, Covering up the strip of paper containing the message immediately after printing the same, substantially as and for the purpose specified.

Fourteenth, The roller, n2, carrying a series of points, and applied in combination with the take-up roller, m2, substantially as and for the purpose described.

Fifteenth, The oscillating shaft, z2, carrying the dog, b3, and arm, y2, in combination with the wheel, w2, escapement wheel, J2, and type wheel, D'', constructed and operating substantially as and for the purpose set forth.

Sixteenth, The stop pawl, k', electro-magnet, F', and perforated strip of paper containing the message, in combination with the oscillating horseshoe magnet, B'', electro-magnet, K2, and printing mechanism, constructed and operating substantially as and for the purpose specified.

[This improvement relates to certain improvements in electro-magnetic telegraphs, whereby any person desiring to send a message, is enabled to prepare the same, send it to the telegraph office, and have it transmitted and delivered without allowing any one to see or understand the same until it reaches the hands of the person to which the communication is to be made.]

49,586.—Tinning and Plating Iron Screws.—Degrasse Fowler and Herbert E. Fowler, Wallingford, Conn., assignors to Henry B. Goodyear, New Haven, Conn.:

We claim, First, The process herein described of tinning and silvering wood screws or other like articles.

Second, We claim as a new article of manufacture, wood screws or other like articles, tinned in the manner herein described.

Third, As a new article of manufacture, we claim wood screws or other like articles, silvered in the manner herein described.

49,587.—Well Drill.—Joseph Hafner (assignor to himself and F. M. Friedenbach), Sterling, Ill.:

I claim the arrangement and combination of the sliding bed, G, with its center operating screw, I, the windlass, B, and square drill, J, with its movable cutters, N, as herein described and for the purposes set forth.

49,588.—Guide for Sewing Machines.—G. W. Harrington (assignor to himself and T. H. White), Orange, Mass.:

I claim the combination and arrangement of the spirally grooved roller, R, the wire, D, and adjustable springs, S, with the bed plate, A B, all operating as and for the purpose specified.

49,589.—Hand Loom.—John W. Hayse (assignor to himself, William M. Gordon and Levi J. Rodgers), Salem, Iowa:

I claim the combination of the batten, c, hooked arm, H, shaft, F, arms or projections, G G, treadles, D, and harness, K, when constructed, arranged and operating in the manner and for the purpose herein shown and described.

49,590.—Fruit Basket.—Edwin A. Jeffery (assignor to The American Basket Company), New Haven, Conn.:

I claim constructing the bottom of baskets, and securing the sides thereto, substantially as herein set forth.

49,591.—Journal Box.—Matthias J. Rice and William H. Miller, Boston, Mass., assignors to Matthias J. Rice:

We claim the application of the oil reservoir to the lower half of the box, so as to be removable from and without disturbance of the box, substantially as set forth.

Also, The extension of the reservoir beyond the ends of the box, when made separate from the box, and the employment of the hoods, n, fitting over such extensions, and against the cap, c, substantially as shown and described.

Also, The oil passages, g, leading to the top of the box, or the part, a, thereof, made directly through and in the body of the casting, constituting the lower part of the box.

Also, The combination of the oil conveyor, h, for lubricating the shaft on one side of the box, with the return passage, g, on the other side of the box, substantially as set forth.

49,592.—Sash Fastening.—Stephen M. Richards, (assignor to himself and Thomas W. Jones), Litchfield, Ill.:

I claim the combination with the horizontally-sliding latches, D D, of the finger-piece, F, cords, b b, and pulleys, d d, when the parts are arranged to operate in the manner and for the purpose described.

[This invention relates to a new and improved sash fastening, and has for its object a more convenient mode than usual of liberating the sash, in order to raise and lower the same.

49,593.—Atmospheric Hammer.—Henry Shattuck, Hamden, Conn., assignor to Bennet Hotchkiss, New Haven, Conn.:

First, I claim the combination of the cylinder, G, with the piston, H, when constructed and made to operate substantially as herein described.

Second, I claim the combination of the piston, H, with the forked connecting rod, c c, and the noddle pin, e, when the noddle pin works in two longitudinal slots in the cylinder, and the whole is connected and made to operate substantially as herein described.

49,594.—Rotary Engine.—J. T. Warren (assignor to himself and Robert Chesbrough), Stafford, N. Y.:

I claim the piston, b, on the disk, f, partition plate, s, the induction post, n, and eccentric cut-off, a' b', all arranged and operating as herein specified.

[This invention relates to a novel and simple construction and arrangement of the parts composing a rotary engine, whereby its effectiveness and power are much increased.]

49,595.—Button.—William B. White (assignor to Egbert E. Richard), North Attleboro, Mass.:

I claim the improved button, as made of the perforated metallic flanged cup, B, and the flat annulus or disk, A, as described, arranged and combined together substantially as specified.

49,596.—Apparatus for Carbureting Air.—Marin Joseph Alphonse Mille (assignor to H. A. G. du Vergier), Paris, France:

I claim an apparatus for carbonizing air, composed of a series of drums, A A' A'', which are filled with some absorbent material and made to communicate with each other by suitable pipes, in combination with an air supply and gas discharge pipe, constructed and operating substantially as and for the purpose described.

49,597.—Process of Preparing Chlorine, Bleaching Powder, Carbonate of Soda, and other products.—Thomas Macfarlane, Acton Vale, Canada East, assignor to himself, R. Leckie and Thomas S. Hunt:

First, The production of chlorine by heating a mixture of calcined green vitriol, common salt and peroxyd of iron in a current of air, in the manner described; and not only the production of chlorine in this manner, but the use of chlorine so produced in manufacturing chloride of lime, chlorine of potash, sulphuric and muriatic acids, or in any process in which gaseous chlorine may be advantageously applied.

Second, The use of the residue resulting from the production of chlorine, from sulphate of iron and common salt, as above described, in the manufacture of carbonate soda and soda ash, substantially as described.

Third, The use of the refractory mixture of burnt lime and slag

for forming the hearths of the furnaces employed in smelting the mixture of sulphate of soda, peroxyd of iron, and charcoal, or coal, substantially as described

Fourth, The described method of decolorizing the deep greenish-colored alkaline solution in the manufacture of carbonate of soda and soda ash.

Fifth, The production of sulphate of iron from the artificial sulphuret of iron in the manner substantially as described.

Sixth, The described process for manufacturing carbonate of soda and soda ash, when the same is combined with the two other parts of my invention, substantially as and for the purpose described.

Seventh, I claim the use of my equivalent apparatus, by means of which my invention may be carried out substantially as described.

49,598.—Apparatus for Rolling Wire.—George Bedson, Manchester, Great Britain:

I claim a guide to be used in the rolling of wire, having the general form and construction herein described and for the purposes set forth.

[This invention consists in a new mode of constructing guiding devices to be used in the rolling of wire, the principal objects being to prevent any breakage of important parts of the machine, and to allow spills or other such detached portions of the metal to escape.]

49,599.—Packing for Well Tubes.—P. Sicouret, Saragossa, Spain:

First, I claim a removable packing for tubes of oil and other wells, composed of annular plates united alternately at their inner and outer edges, so as to be capable of being drawn away from each other when the packing is to be removed, substantially as and for the purposes above described.

Second, I also claim, in combination, a series of annular plates of elastic and flexible material, connected to each other, and annular metallic collars or heads above or below them, substantially as above described.

Third, I also claim, in combination, a series of annular plates of elastic or flexible material, connected to each other as shown; annular metallic collars or heads above and below them, and a set of lifting rods for each collar or head, substantially as described.

Fourth, I also claim in packing the tubes of oil and other wells, applying the packing apparatus by bringing the packing surfaces or the edges of the material used into, or nearly into, a flat or horizontal position, and of collapsing and retiring the same from the sides of the tube and of the well by bringing such surfaces or edges into angular positions, all substantially as above described.

REISSUES.

2,054.—Watchman's Time Detector.—Jacob E. Buerk, Boston, Mass., assignee of John Burk. Patented January 1, 1861:

I claim the use of a movable strip, made of paper or other suitable material, and marked off in a convenient number of parts, in combination with a chronometer movement, and with one or more points or devices for producing marks or indentations on said movable strip, substantially as and for the purpose set forth.

Second, The employment of a series of keys, C, with bits of different shape, in combination with spring points, B, and with a drum, A, carrying a strip of paper, F, and rotating by a clock movement, substantially as and for the purpose specified.

2,055.—Meat Cutter.—R. V. Jones, Canton, Ohio. Patented Nov. 2, 1858:

I claim the combination of a shaft, provided with spiral flanges, with a concave case, provided with ribs upon its internal surface, the two being used and operating as and for the purpose herein specified.

Second, The combination of a shaft provided with spiral flanges, with a knife or knives, used in a concave case, as and for the purpose herein specified.

Third, The employment of a spiral flanged shaft, in combination with and revolving in a ribbed case, provided with a stationary knife or knives, as and for the purpose herein specified.

2,056.—Apparatus for Folding Paper Collars.—G. W. Ray and V. N. Taylor, Springfield, Mass., assignees of A. H. Hook. Patented March 7, 1865:

I claim the elastic folding surface, whether in an inclined or other position, on which the knife acts in folding, as herein described, in combination with the gages, m, substantially as and for the purpose set forth.

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Notes and Queries

A. C. B., of Ohio.—A cement for marble or stone in exposed places is made as follows:—Twenty parts of clean, white sand, two of litharge, one of quick lime, mixed to a putty with linseed oil. It gets as hard as a stone in a short time.

J. R., of N. Y.—Hilton's cement, sold in stores, fastens leather to wood; so does common glue.

W. D. G., and several others.—You will find nearly all your suggestions in relation to the details of a flying machine in back numbers of the SCIENTIFIC AMERICAN. The first step is to get sufficient power in proportion to the weight. Some parties in Boston are experimenting on this, and we are promised the results as soon as ascertained.

E. H., of Ohio.—We find your demonstrations not sufficiently brief and plain for our columns.

S. E. D. T., of Pa., and R. G., of N. Y.—We have not the information you seek.

J. L. B., of N. Y.—We must refer you to Vol. XII. for recipes for making blacking. We cannot publish them so many times over.

H. C. S.—Send $1 to complete subscription to present volume. Remit $3 for the other information.

J. P. F., of Ohio.—We should not think your shavings would be so good as oats for packing eggs.

G. W. P., of N. Y.—Are you sure you have not mistaken the planet Venus for a comet? It is now the morning star. Astronomers are looking for two comets, but we have not heard that either has yet made its appearance.

G. H. P., of N. Y.—More than thirty years ago Rufus Porter had a plan for propelling a spindle-shaped balloon by a spiral fan driven by a steam engine, and, we presume, the idea is much older than that, as it would be the first to occur to any mechanic after balloons came into use.

W. H., of Maderia.—We shall be obliged to refer you to Messrs. Havemeyer & Elder for information in relation to cleaning animal charcoal that has been used in sugar refineries.

W. S. N., of Mo.—Canada balsam is the substance usually employed in mounting microscopic objects. You will find full directions in "Carpenter on the Microscope."

D. G. B., of Conn.—There are several patents on self-acting wagon brakes.

J. D. S., of Mass.—There is a patented process for bleaching rubber and allied gums, including gutta-percha. The inlaying process we are unacquainted with.

J. R., of Ohio.—The beater hay-press must be advertised in you local papers. The best devices in this line are illustrated in the SCIENTIFIC AMERICAN. Make your own selection.

F. K. H., of Pa.—You can obtain an indicator of the Novelty Iron Works or Charles Copeland, Esq., both in this city.

E. J. T., of Mass.—A dip for cast brass is, vitriol, 1 quart; niter, 1 quart; water, 1 quart; must be stirred while used.

C. R., of Ill.—We believe there are a number of wood-bending machines capable of doing the work you specify.

J. H. T., of Vt.—We have published directions for making matches without sulphur so many times that we must refer you to back numbers

IMPORTANT TO INVENTORS.—HAVING CORRESPONDENCE with business firms in all the principal cities and towns in the Northern States, I am prepared to manufacture or sell on commission. I shall exhibit articles at Mechanics' Fair, Boston, and at American Institute, New York, and at all Fairs in the country. References given.
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THE EIGHTEENTH ANNUAL EXHIBITION OF THE Maryland Institute of Baltimore, for the Mechanic Arts, will commence on Monday Evening, the 2d of October, and continue to Monday Evening, the 30th of October, 1865.
The hall will be open for the reception of goods on Monday, the 25th of September.
Goods for Competition and Premium must be deposited before Thursday Night, the 28th of September.
Circulars, embracing details, may be had of the Actuary at the Institute.
Communications addressed to the undersigned, or Joseph Gibson, Actuary, will be promptly attended to. W. W. MAUGHLIN,
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THE AMERICAN INSTITUTE HAVING ENGAGED the spacious Armory on Fourteenth street, in the City of New York, will hold their 36th Annual Fair from the 12th day of September to the 19th of October next. Articles for Exhibition will be received from the 6th to the 12th of September. The exhibition will consist solely of American Inventions, Machinery and Manufactures and Agricultural and Horticultural Productions. The time for a reunion of American Inventors, Manufacturers and Agriculturists was never more appropriate than the present. The American People, after vindicating their nationality and demonstrating the importance and magnitude of their Mechanical and Agricultural Resources, enter now upon a new career, when it becomes alike the duty and interest of every citizen to promote the reward of American Ingenuity and the encouragement of American Manufactures and Productions. Individuals and Companies engaged in these industries are invited to co-operate by contributing for exhibition the product of their skill and industry, thereby promoting and advancing the material prosperity of the country. Every indication promises to make this exhibition one of the grandest and most varied ever held in this country, while the managers are determined to use every effort toward the accomplishment of such a result. Machinery in motion will constitute the great feature of the Fair, and steam power will be provided. Premiums of Gold, Silver and Bronze Medals and Diplomas will, by competent and impartial judges, be awarded to those exhibitors whose articles shall be adjudged most meritorious. Special Premiums of Gold and Silver Medals, and Silver Cups and Plate will be awarded on such articles as are set forth in the circulars issued by the Board of Managers. All correspondence must be directed to Prof. S. D. TILLMAN, Sec. American Institute, New York City, and articles for exhibition to JOHN W. CHAMBERS, Clerk of American Institute, Armory 14th street, New York City, freight prepaid. 4 3 & 2eow

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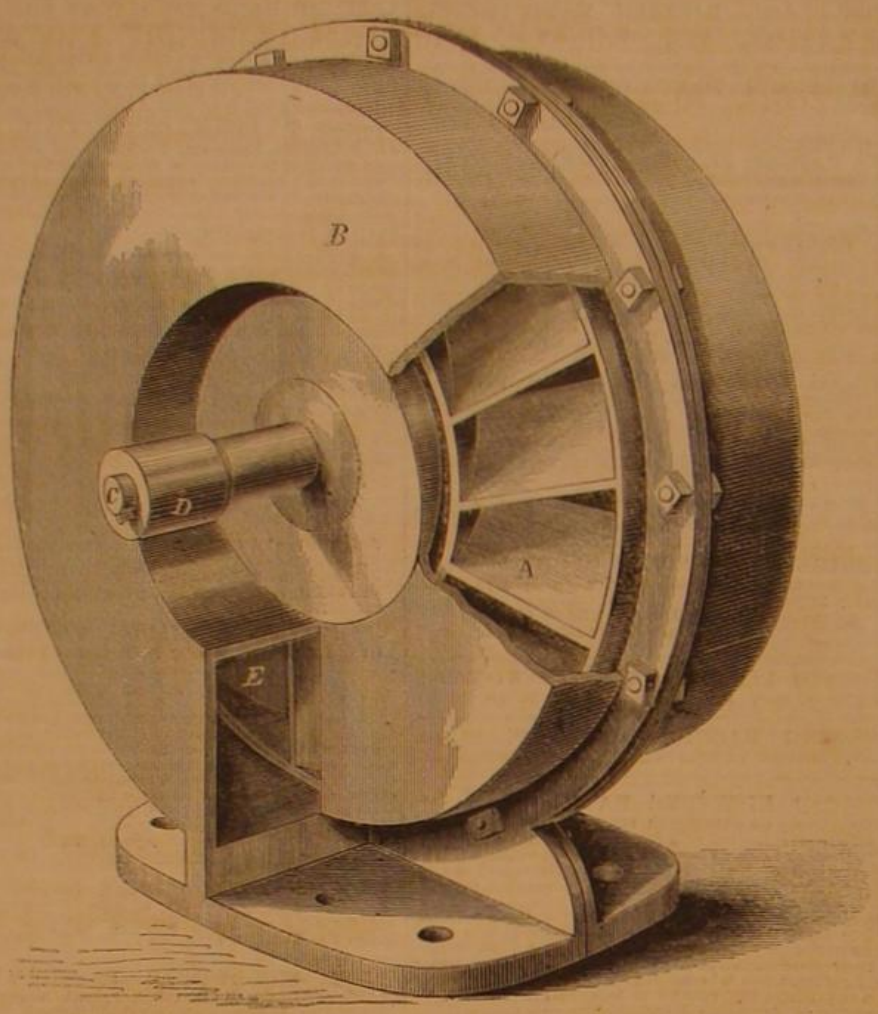

FARMER'S FAN BLOWER AND EXHAUST.

run in opposite directions, so that a scroll-shaped channel is made by the passages.

When the wheel is revolved rapidly it causes a current to ascend the opening on one side and pass around to the other, from whence it issues with great velocity, and is carried into chutes or pipes to feed supply fires in forges or furnaces.

The patentee says, respecting it, that "one of them, 12 inches in diameter, making 2,500 revolutions per minute, gives a pressure of between five and six inches per water gage. It takes less power than any other to drive it, and is not liable to get out of order."

The invention was patented Oct. 18, 1864. For further information address Wm. Farmer, Manhattan Gas Works, 18th-street Station, New York.

Inventors and Their Inventions.

As an example of the way in which the English Government—that assumes the right of using our inventions without paying for them—treats inventors, we may mention that, although more than twenty years ago a select committee having reported that Captain Norton's concussion fuse was simple, safe, and efficacious, and possessed other valuable qualities, the late Sir George Murray, then Master-General of the Ordnance, recommended him to Government for the ordnance pension of £500 a year, he has not as yet received one farthing of this pension. The same Captain Norton, as appears from the remarks of Captain T. A. Blakely, R. A., in the "Transactions of the Royal Irish Academy," May 14, 1860, began to fire elongated bullets in the year 1823, and soon overcame those unexpected difficulties which meet the first experimenter in every branch of science. His success was unfortunate for himself and useless to his country, which only acknowledged the justice of his views after Messrs. Delvigne and Minie had worked out the problem for the French Government. The late Mr. Rigby, gunmaker in Dublin, stated in the public journals, about the year 1846, hat the great improvement in the rifle was due to the ongated bullet.—*Science Review*

STAGG'S STEP LADDER.

Very great improvements have been made in step ladders for the past few years, and nearly every day ushers in some novelty. These improvements relate principally to the reduction of the weight and unwieldiness of the ladder, so that they are made much easier to handle and more secure when in use.

On ordinary step ladders an individual feels very much as if he were on stilts, and as if his violent precipitation to the earth was only a question of time.

The ladder here represented is a convenient and very substantial one. In addition to the ordinary frame, A, it has a secondary one, B, which is a valuable assistant in bracing the ladder. This additional fixture has its bearing at the top in an inclined slot-

ted piece, C. By this arrangement it can be folded up out of the way entirely when not in use. At the bottom there are two hooks, D, which fit over the round, E, and keep the two frames together.

These step ladders are found to be very convenient, and well adapted for use in pantries, closets and libraries, where the common step ladder is not only unsightly in appearance but difficult to manage.

This invention was patented through the Scientific American Patent Agency. For further information address D. I. Stagg, No. 15 Morton street, New York.

FROM THE STEAM PRESS OF JOHN A GRAY AND GREEN.