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Automatic Stop-motion for Steam Engines.

When the governor was first applied to the steam engine, it was as great an improvement as rendering the valves self-operating. Previous to the adoption of this detail the machine ran unevenly. Like a pulley hung out of truth, it moved fast and slow and was altogether a crude affair.

When Watt adopted the common two-ball governor on his engines, the defect spoken of was remedied and the value of the steam engine as a motive power was very greatly increased. From his day, up to the present time, it has been the object and aim of inventors to render this detail of the wondrous machine what its name signifies—the controller of its movements and watchful guardian of its every stroke.

From merely admitting steam to the steam chest, from whence the slide valve admitted it to the cylinder, ingenious men began to ask themselves whether it could not be directly connected to the main valve and thus exert a more direct influence upon the velo city of motion and govern the strokes with greater nicety.

In the Corliss and other engines this idea is carried out, and the modifications which the old-fashioned two-ball governor has undergone have not changed its character but merely enlarged the sphere of its usefulness.

The engravings published in connection with this article show still another duty that can be performed with the governor. It is a very important one, and for want of this simple arrangement thousands of dollars have been expended in repairs, and many working days lost to the operatives. When the belt of the governor slips off or breaks—which very often happens—the engine is uncontrolled, and it takes advantage of this fact and runs away. If the engineer happen to be standing by the throttle valve he can close it immediately and prevent the damage which is likely to ensue. But the engineer is not always at the post in question, for he has many duties to perform which render his presence at the point indicated simply impossible, therefore some self-acting sure-working device to supersede the necessity of the engineer standing in one place to guard against an exigency which may occur at any time and may not happen for months, becomes quite apparent.

Regularity of motion is, in most factories, a paramount consideration; therefore, if the governor be thrown out of action by breaking the belt, the speed instantly runs up. *In cotton mills* the greatest confusion is caused by this accident; in flouring mills it is also exceedingly injurious, and even in machine shops we have seen belts torn off and wound up in a tangled mass from rapid increase in the velocity of the shafting. All manufacturers, however, know very well that breaking the governor belt is by no means an unusual occurrence, and we therefore proceed to the consideration of the engravings.

Fig. 1

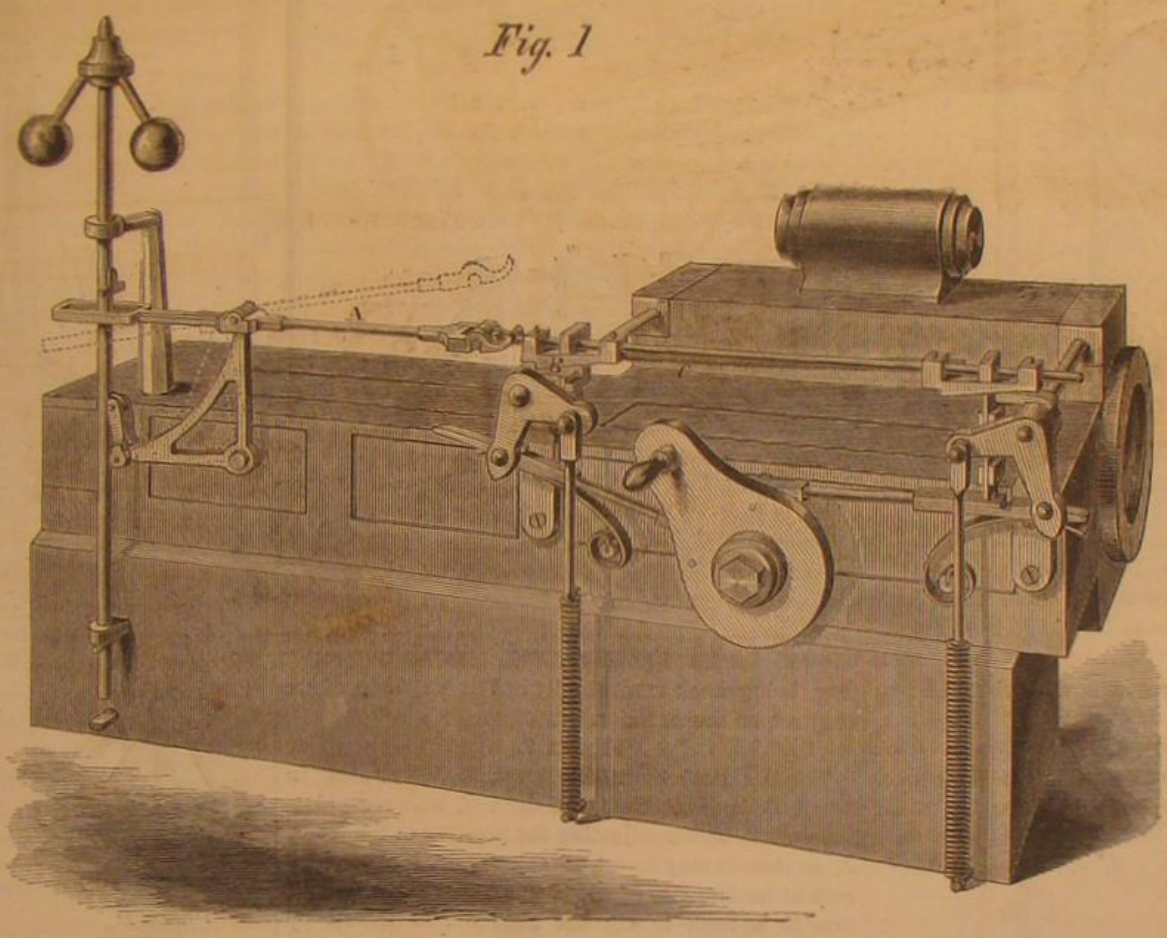
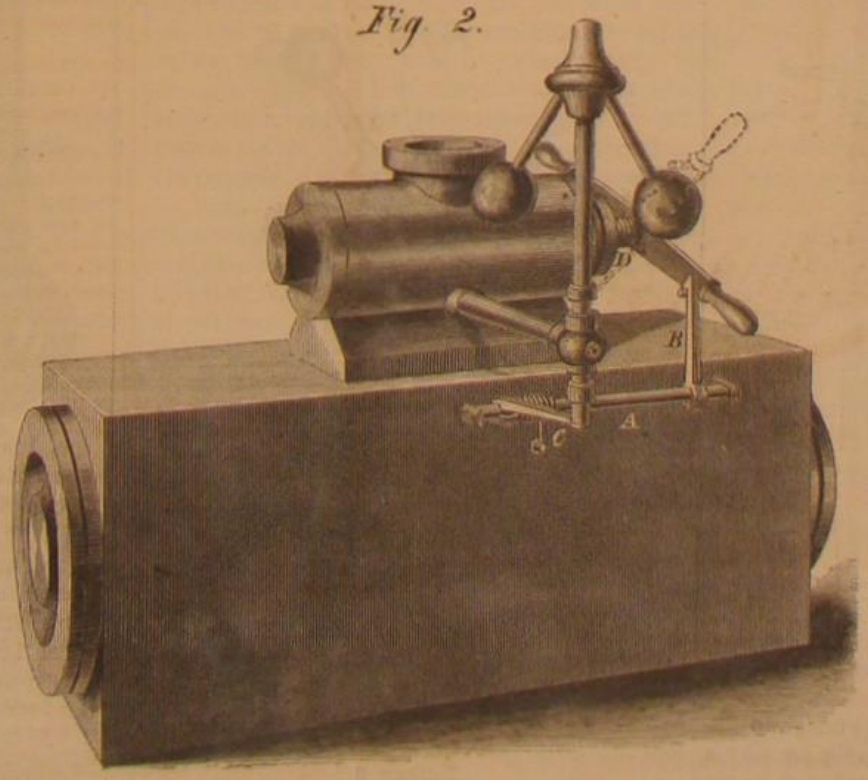


Fig. 2.



AUTOMATIC STOP-MOTION FOR STEAM ENGINES.

The object of this invention is simply to use the governor to stop the engine when the belt slips off or breaks, and thus do what is necessary to be done *on the instant*. It also provides a means of stopping the engine from any one room of the factory, for not unfrequently the main belts, transmitting motion from one room to another, run off the pulleys; before communication can be opened with the engineer much damage ensues which ought to be avoided.

All of these objects are effected by a very simple means, as will be seen by referring to the several engravings.

FIG. 1.—PATENTED AUG. 24, 1858.

With this arrangement, in case the regulator belt should break or slip on the pulley, the balls drop down and trip the lever, A; this lever is in connection with the incline plane rod, B, liberating the lever, which is thrown forward by means of a weight or spring, C, far enough to trip the hooks from off the catches. The same result may also be obtained by attaching a wire to the lever, thus enabling a person in any room to stop the engine in case any one should be caught by belts or gear, or in case an accident to the machinery should render it necessary to stop the engine immediately.

FIG. 2.—PATENTED OCT. 21 1862.

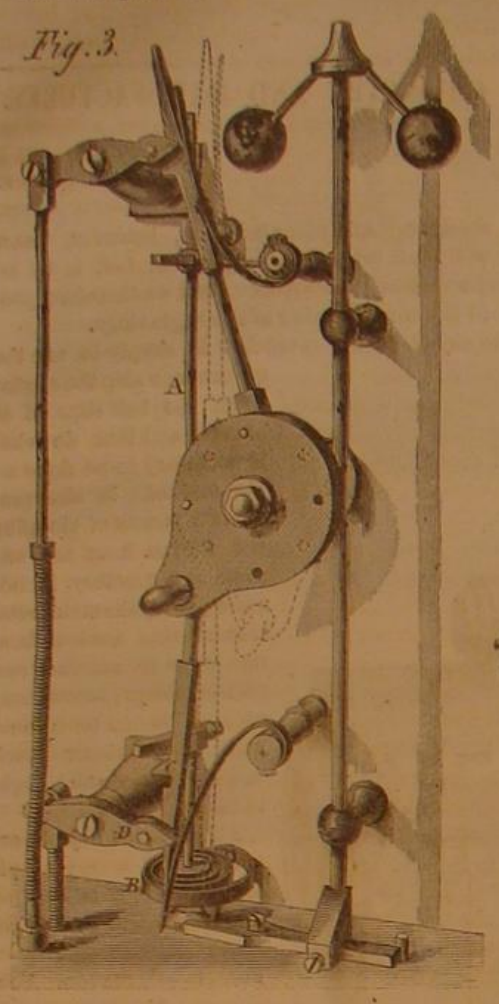
This engraving represents a method for stopping the engine by shutting off the steam through the action of the throttle valve. It can be applied to any kind of engine, new or old. The arrangement is merely a shaft, A, and an arm, B. This arm catches over a pin in the handle of the throttle valve. When the governor belt breaks or runs off, the balls fall and trip the catch by the arm, C: a spring, D, on the throttle valve shaft then closes the valve immediately, as shown by the dotted lines.

FIGURE 3.

This arrangement is applicable to an upright engine. In case the driving band should slip on its

pulley or break, the regulator balls drop down far enough to trip a lever (not shown) by means of an inclined sliding piece made to work in or out of the way, as occasion may require. This action liberates a ratchet gear on the end of the upright shaft, A, thereby causing the shaft to turn round by means of a spring, B, far enough to throw back the hooks, C, from the pins, D. These hooks operate the main

Fig. 3.



spring attached to draw up the back end of the trip lever, B, far enough to depress the shoes, C, from their catches. The springs are so fixed in every case as not to affect the free action of the governor.

FIGURE 6.

This arrangement is applicable to engines of the Green patent, but may be applied to others of various kinds. In the case of the Green engine, if the governor belt breaks or slips, the shaft moves up far enough to throw out the lever, A, from its groove, B (see section), thus liberating the shaft, which is thrown down by means of a spring, C, far enough to depress the tappets, so they will pass by the catches. Some springs are made so as to be inside of the coup-

Fig. 4.

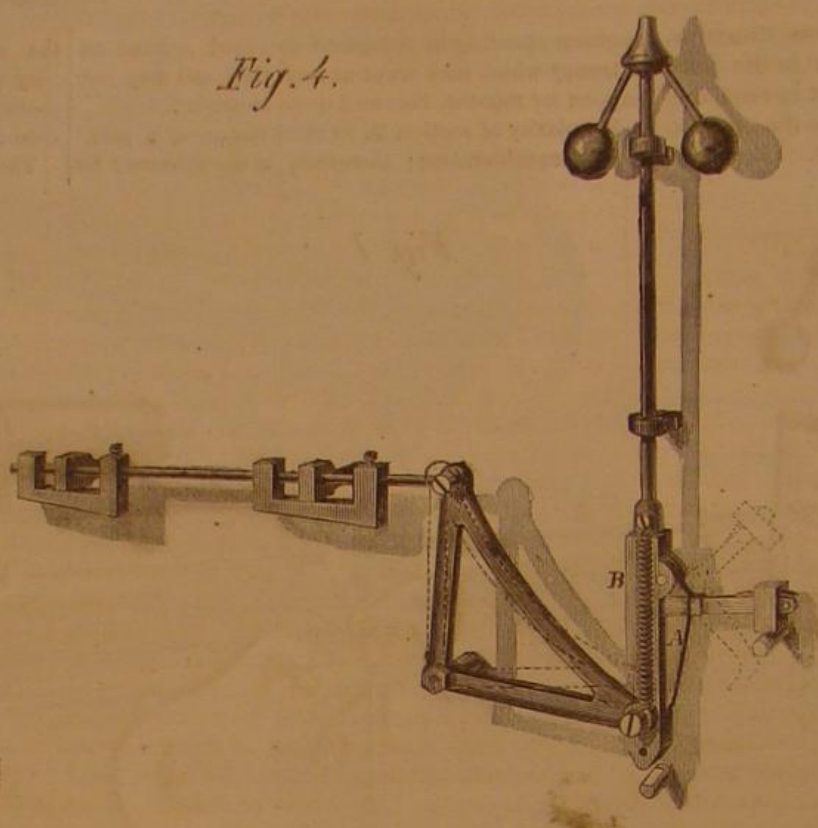
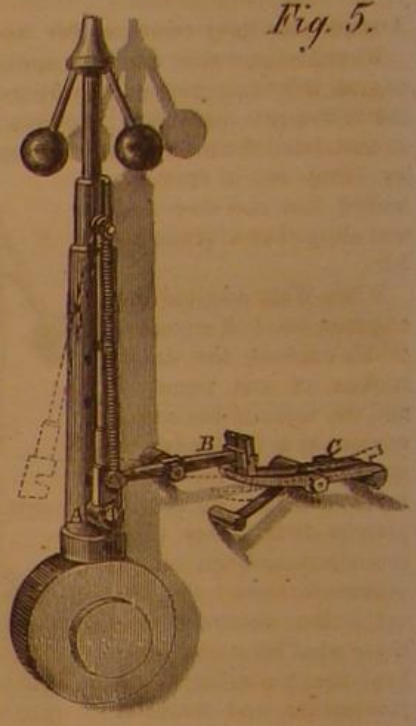


Fig. 5.



applied, in no way interferes with the free action of the regulator, and a wire may, in all cases, be attached to the stop motion so as to stop the engine from any room or from a distance of several blocks of buildings.

Applications for patents are now pending on the several plans above illustrated which are not specified as being already patented. For further particulars address the Automatic Stop-motion Company, Newburyport, Mass.

HOW TO DETECT COUNTERFEITS.

We have received from the authors, Messrs. E. J. Wilber and E. P. Eastman, of the Commercial Col-

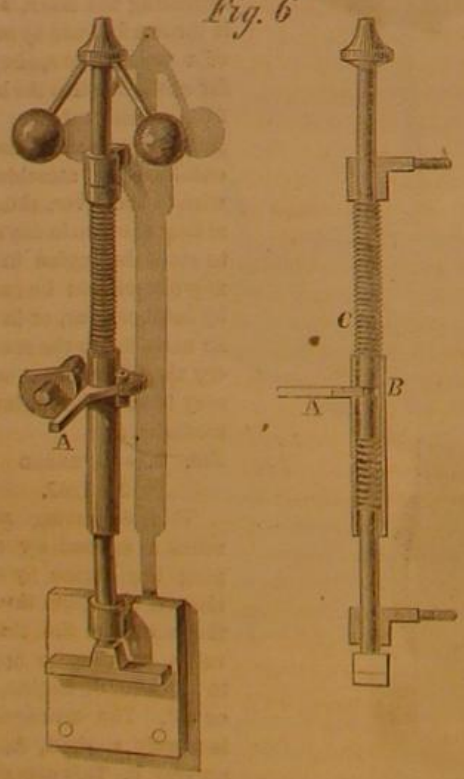
AUTOMATIC STOP-MOTION FOR STEAM ENGINES.

valves which, of course, cease moving when the two are disconnected.

FIGURE 4.

This arrangement is applicable to a double engine. In case the regulator belt should break or slip on its

Fig. 6.



pulley, the balls would drop down far enough to liberate the straight or bent arm, A, thereby causing a pin in the slotted coupling to be released and drawn up by means of the spring, B, throwing the inclines far back enough to depress the hooks from their catches, thus stopping the engines.

FIGURE 5.

When the regulator, from any cause, drops down, the hook, whose lower end is an incline, strikes upon a cam, A—which may be turned up or down at pleasure—and is thrown off from its pin, thus enabling a ling, being much more sightly in this way than where they are on the exterior.

FIGURE 7.

This is a straight or bent lever, A, terminating in a ball, B, both attached to a shoe, C, with a regulatting screw, D, for adjusting the position of the lever, A, so that it may be set at any required angle. In case of an increase of speed this ball will be thrown over far enough to trip the shoe off, as shown by

Fig. 7.

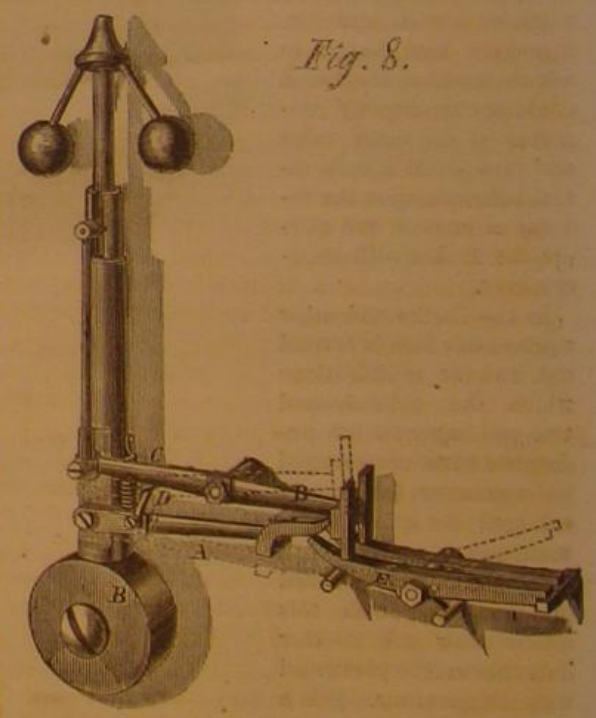


dotted lines. On the Green engine it may be attached to the sliding bar for the purpose of depressing the tappets so that they may pass without catching. This is entirely independent of the regulator.

FIGURE 8

This arrangement is a forked lever, A, one end of which is attached to the regulator stand, B, the other end is supported by a spiral spring, C. The forked lever, A, is put in operation by the trip lever, B, by means of the button or arm, D, which may be turned up or down. When the regulator drops down it depresses the forked lever far enough to liberate the shoes, E, from the catches. The invention, however

Fig. 8.



lege, Poughkeepsie, N. Y., a copy of their treatise on counterfeit bank notes. It is an elegant little volume of 50 pages, gilt edged, handsomely bound in red cloth, and illustrated with a large number of fine copper and steel plate engravings made by the New York Bank Note Company. The several parts of a bank note are minutely described, and the differences between the genuine and the counterfeit are fully pointed out. As a sample of this work we extract what is said in relation to portraits:—

"In no department of the counterfeiter's art has he met with more signal failure than in attempting to delineate the 'human face divine,' which, as one has beautifully and truthfully observed, 'is the painted stage and natural robing-room of the soul.'

'GENUINE.—In the true bill, the mouth, eyes and face have an expression clear and distinct.

"The hair, even in its most delicate wavings and strands, is accurately copied. The hands, and especially the fingers, will be found proportioned to the

figure. The texture of the skin has not escaped attention, and indeed, in every respect, to the very minutiæ of detail, the portrait will bear close scrutiny.

"The more familiar portraits, as those of Washington, Franklin, Clay and Webster, 'the old familiar faces,' will strike the eye at once as being accurate, and the longer and more critically observed, the more perfect will the resemblance appear.

"COUNTERFEIT.—In the counterfeit, the eye will be found not unfrequently without a pupil; the delicate lines about the mouth omitted or constrained so as to give a rigid and unnatural expression to that very important feature of the face; black lines encircle the head, spots and broken lines appear on the cheek and neck, none of which are seen on genuine notes. Bank-notes may be so nearly worn out, it is true, as to make it no easy task to trace and follow out the symmetry and fineness of all parts of the portrait; but if any portion of the portrait is left entire, our remarks will be found applicable to that portion."

Price of the work two dollars.

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:—

Stills for Petroleum and other Liquids.—This invention is the subject of three patents. The first is for making a combustion chamber in the furnace of stills, which rises upward within the retort, and thereby heats the body of the charge in the retort within, while the charge is also exposed to heat on the outside of the retort. The second is for surrounding the retort of a still outside of the flue space with a jacket of non-conducting material to prevent the loss of heat; also in the use of steam for cleaning the retort from residuum or sediment which may collect on its bottom; also in a peculiar construction of furnace by which air is supplied to and mixed with gas before they issue from the fire surface of the furnace. The third patent is for placing a movable furnace below a still, so that the heat can be regulated; also in the construction of a hollow furnace for using gas and air combined, and which are mixed in the furnace itself, and delivered through holes in the top plate of the furnace. G. H. S. Duffus, of New Orleans, La., is the inventor.

Pump.—This invention consists in an oscillating vacuum pump whose valve is opened by means of the contact of the valve stem with an inclined plane below it, and closed by a spring. The joint of the valve stem is packed by means of an elastic ring, and the hollow journal which connects the cylinder with the receiver is also packed by a like ring. A. S. Lyman, of New York City, is the inventor.

Safeguard for Protecting Pottery Ware.—Pottery ware, during the process of burning or baking, requires to be protected from cinders, smoke and other substances which are liable to come in contact with it and impair its value. At present the articles or ware are placed within a cylinder made of free clay, and provided with a close bottom, the articles being placed one over the other, and prevented from being in contact by means of rods or pins. The cylinders are made of various sizes, according to the size of the articles they are to receive, and are placed one over the other in the furnace, in rows or tiers. These cylinders, commonly termed safeguards or saggers, are attended with some disadvantages. In the first place it is rather difficult to adjust the articles in and remove them from the cylinders, and considerable room or space is lost by them, and the top article in each cylinder liable to be injured by fragments dropping from the bottom of the cylinder immediately above. These difficulties are fully obviated by this invention, which consists in forming the cylinders of a series of rings, provided with a flange or annular lip at their lower edges, and with a corresponding recess in their upper edges, so that one ring may be fitted over the other, a vessel or article to be burned or baked being fitted in each ring, and resting on pins thereon. Benjamin Jackson, Trenton, N. J., is the inventor.

Steam Boiler.—This invention relates to a new and improved application of a float to steam boilers, for the purpose of indicating the hight of the water therein, sounding an alarm when the water is below a certain level, and also, if necessary or desired, be made the means for putting in operation a pump to supply the boiler. The objection to the use of floats in steam boilers to indicate the hight of the water has been that they are frequently affected by the foam so as to be very unreliable, and further that the gage rod attached to the float and passing through a stuffing box or guides is so restricted in its free movement by friction as to render the action of the float very uncertain. This invention is designed to obviate these difficulties, and to this end it consists in isolating the float from the mass or bulk of water in the boiler and still have the float expand to the same influences of buoyancy and steam pressure as when in the boiler, whereby the float is rendered reliable by being placed beyond the action of foam. The invention consists further in connecting the float rod with a lever at the exterior of the boiler in such a manner as to avoid all inaccuracies due from friction, and at the same time form a perfect water-tight joint, where the rods, which form a connection between the float rod and the lever, pass through the casing or box in which the float rod is fitted or works. Joseph Yates, of Mott Haven, N. Y., is the inventor.

Portable Lantern.—This invention consists in combining a socket or spring to receive a candle, with a case having a glass front, and in such a manner that the tube may be shoved entirely within the case when the lantern is not required for use, and also adjusted so that the tube may serve as a handle when the lantern is in use and a handle is required. The case of the lantern is provided with a cover, which closes over the glass part and protects it when the lantern is not in use, and is capable of being raised to serve as a reflector when the lantern is in use. The invention is more especially designed for army or camp purposes, but it will prove a convenient device for general use, it being durable, and the case constructed in such a manner that no solder is required, which frequently melts under the heat of the flame, and causes the parts to become detached. Charles Deavs, assignor to Archer & Pancoast, of 9 Mercer street, New York City, is the inventor.

Folding Chair, Table, Etc.—This invention consists in a folding chair, table or other similar article, the seat or top of which is made of canvas or other flexible material, and supported by a series of radiating arms, which are hinged to a central hub, secured to the upper end of a longitudinally-sliding staff, in combination with hinged braces, connected to the radiating arms, and made to radiate from a sleeve through which the staff slides, and which is supported by hinged legs connecting by means of toggle arms with a ring fitted on the lower end of the central staff in such a manner that by expandind the legs and depressing the central staff the seat or top is expanded and rendered rigid, and at the same time the toggle arms assume such a position they retain the legs and prevent them from collapsing accidentally; but by slightly raising the center staff the toggle arms are brought in such a position that the chair, table or other article can be folded up with the greatest convenience and in a small compass. If desired, the legs and seat or top may be disconnected and each folded or expanded separately. Ferdinand Ludke, 287½ Bowery, New York, is the inventor.

Improvement in Mirrors.—We have lately examined some most beautiful specimens of mirrors prepared by a new process for which a patent has just been granted to Louis Paul Angenard, of New York city. The reflecting compound is made in the following manner:—Dissolve two-thirds of an ounce of platinum, by means of heat, in two and a half ounces of muriatic acid and one and one-sixteenth ounces of nitric acid. Evaporate the acids; then pulverize the mass, reduce with alcohol, and apply the solution with a brush to the glass surface. The glass is then heated in an oven till it reaches the cherry-red color, when it is allowed to cool and the operation is finished. The whole process is exceedingly simple, quick and economical, and the resulting mirrors are of superior quality. The adhesive properties of the compound are much superior to the ordinary silvering mixture and the reflecting surface seems to be more brilliant. This improvement promises to revolutionize the mirror business, as it facilitates the silvering or platinizing of the largest and finest kinds of mirrors, at a hundredth part of the present cost. Specimens may be seen at the establishment of Julius H. Pratt, No. 86 Chamber street, New York.

Furnace Grate Bar.—Furnace grate bars are usually cast with a groove in the edge so that the ashes will lodge therein and thereby the injurious effect of the heat on said edges is reduced. The ashes protect said edges to some extent from being burned. The object of this invention is to facilitate the manufacture of such grate bars by casting them in pairs or two simultaneously on one and the same core whereby the labor is considerably reduced and a better article is produced, and furthermore by the taking for the core a chill or a piece of metal, the surfaces of the grooves are chilled and their faculty to conduct heat is thereby considerably reduced so that the same are much better able to be exposed to the heat of the fire than grate bars cast in the ordinary manner. J. A. Miller, 200 Broadway, is the inventor.

Safety Valve Regulator.—The operation of this invention is as follows:—When the regulator is set to control say a pressure of steam of 50 lbs. on the boiler, on the pressure getting up to 51 lbs. it will act as the ordinary spring balance supposing that to be suddenly unscrewed to 48, and on the pressure getting up further to 52 lbs. it will act as the spring balance if that were further immediately unscrewed to 46 lbs., and so on for every pound of increase of pressure on the boiler the regulator will allow the steam to blow through the safety valve at a similarly increasing rate, and this action is reversed on the steam coming down to the proper working pressure. It can also be made to indicate the pressure of the steam in pounds from 1 pound upward. Peter Riordan, Washington, D. C., is the inventor.

Manufacture of Paper Boxes.—This invention relates particularly to an improvement in that class of boxes which have heretofore been made of pasteboard, and are used in mercantile houses and trades of almost every kind under the name of paper boxes. The high price of paper and pasteboard has made it desirable to find some other cheaper material which can be worked in the same manner as pasteboard, and this object has been accomplished by the present invention which consists in the employment or use in place of pasteboard, of slats of wood prepared by gluing or pasting two or more thicknesses of veneers one on the other, the grain of one veneer being made to run endways to the grain of the other, until a sheet is obtained similar in size to the sheet of pasteboard so used in the manufacture of boxes, in such a manner that said sheet of wood can be marked off, folded and cut up for a number of boxes precisely in the same manner as pasteboard. Fred. W. Fliedner, 17 and 19 Bowery, New York, is the inventor.

Coal Oil Stove.—The object of this invention is to obtain a simple and portable stove in which coal oil may be economically used as a fuel. Coal oil, as is well known, generates, burnt in a lamp for illuminating purposes, a great amount of heat, and where a draught chimney is used a greater amount of heat is evolved or radiated from the lamp than when an open or no chimney burner has been used, in consequence of a more perfect combustion being obtained with the chimney burner. This invention consists in using with a coal oil lamp, of any suitable construction, a draught chimney, and a draw arranged in such a manner that the heat evolved or radiated from the lamp may be advantageously employed for cooking or culinary purposes. It consists further in applying to the chimney a door and glass by which the lamp may be lighted and the flame regulated without removing the chimney from the lamp. C. H. Reichmann, of New York City, is the inventor.

TO OUR READERS.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and enclosing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1853, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

MODELS are required to accompany applications for Patents under the new law, the same as formerly, except on design patents, when two good drawings are all that are required to accompany the petition, specification and oath, except the Government fee.

RECEIPTS.—When money is paid at the office for subscriptions, a receipt for it will always be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona fide* acknowledgement of our reception of their funds.

EXTRACTS FROM HELMHOLTZ.

Among the collection of treatises on the Correlation of Forces, collected by Professor Youmans, by far the most readable is that of Professor H. L. F. Helmholtz, of the University of Heidelberg. From his essay we take the following extracts.

HEAT AND MECHANICAL FORCE.

In the collision and friction of bodies against each other, the mechanics of former years assumed simply that living force was lost. But I have already stated that each collision and each act of friction generates heat; and, moreover, Joule has established by experiment the important law, that for every foot-pound of force which is lost, a definite quantity of heat is always generated, and that when work is performed by the consumption of heat, for each foot-pound thus gained a definite quantity of heat disappears. The quantity of heat necessary to raise the temperature of a pound of water a degree of the centigrade thermometer, corresponds to a mechanical force by which a pound weight would be raised to the height of 1350 feet; we name this quantity the mechanical equivalent of heat. I may mention here that these facts conduct of necessity to the conclusion, that the heat is not, as was formerly imagined, a fine imponderable substance, but that, like light, it is a peculiar shivering motion of the ultimate particles of bodies. In collision and friction, according to this manner of viewing the subject, the motion of the mass of a body which is apparently lost is converted into a motion of the ultimate particles of the body; and conversely, when mechanical force is generated by heat, the motion of the ultimate particles is converted into a motion of the mass.

DIFFERENCE IN TEMPERATURE.

Besides the mathematical form in which the law was first expressed by Carnot, we can give it the following more general expression:—"Only when heat passes from a warmer to a colder body, and even then only partially, can it be converted into mechanical work."

The heat of a body which we cannot cool further, can not be changed into another form of force; into the electric or chemical force, for example. Thus, in the steam engine, we convert a portion of the heat of the glowing coal into work, by permitting it to pass to the less warm water of the boiler. If, however, all the bodies in nature had the same temperature, it would be impossible to convert any portion of their heat into mechanical work. According to this, we can divide the total force store of the universe into two parts, one of which is heat, and must continue to be such; the other, to which a portion of the heat of the warmer bodies, and the total supply of chemical, mechanical, electrical, and magnetical forces belong, is capable of the most varied changes of form, and constitutes the whole wealth of change which takes place in nature.

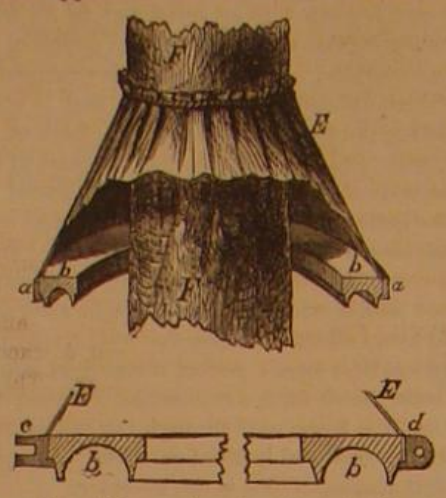
THE FINAL RESULT.

But the heat of the warmer bodies strives perpetually to pass to bodies less warm by radiation and conduction, and thus to establish an equilibrium of temperature. At each motion of a terrestrial body, a portion of mechanical force passes by friction or collision into heat, of which only a part can be converted back again into mechanical force. This is also generally the case in every electrical and chemical process. From this, it follows that the first portion of the store of force, the unchangeable heat, is augmented by every natural process, while the second portion, mechanical, electrical, and chemical force, must be diminished; so that if the universe be delivered over to the undisturbed action of its physical processes, all force will finally pass into the form of heat, and all heat come into a state of equilibrium. Then all possibility of a further change would be at an end, and the complete cessation of all natural processes must set in. The life of men, animals, and plants could not of course continue if the sun had lost its high temperature, and with it his light,—if all the components of the earth's surface had closed those combinations which their affinities demand. In short, the universe from that time forward would be condemned to a state of eternal rest.

THE *Invalide Russe* says: A fourth enormous cannon of iron was lately cast at Petrozavodak, in Russia, on the American system—that is to say, by cooling the inside with water.

MERRITT'S TREE PROTECTOR.

The man who has seen his apples and elms annually stripped of their foliage by canker worms, and gradually withering beneath the devouring hosts of these insects will be glad to know that their pathway up the trunks of his trees can be effectually barred. The little apparatus illustrated in the annexed engravings is said by eminent entomologists to be an effectual protection against the attacks of the canker worm.



Francis G. Sanborn, Esq., Massachusetts State Entomologist, thus describes the insect:—

"The *Anisopteryx vernata*, the canker warm, as it is called, is a small ten-footed naked caterpillar, belonging to the family of geometers, or span worms. They derive this name from their peculiar mode of progression, which is effected by grasping the surface of the bark or other substance on which they may be placed, with the six fore-feet, the body being extended in a straight line; the two pairs of hinder feet are then brought nearly up to the spot occupied by the others, the body in this position forming a loop, and the animal closely resembling the letter U.

"The parents of this creature are of entirely different form, the male being a delicate gray moth, with slender body, six feet, and four thin silky wings; and the female of similar color, but wingless, and with a much larger body, having six very slender feet.

"After the 1st of October she emerges from the ground and ascends the trees, for the purpose of depositing her eggs. During the winter months every warm and sunny day will discover many of the females slowly crawling up the trees and fences, while the males may be seen hovering around them, pairing, or resting on the bark, with their wings folded flatly back, forming a triangular figure. The eggs are now being laid in flat patches on the surface of the bark or fence in clusters of sometimes more than a hundred."

This apparatus is designed to prevent the female moth from crawling up the trunk of the tree. A small tent-shaped circle of cloth, E, is secured at its upper end around the trunk, F, of the tree, by means of an elastic band of gutta percha or india-rubber. The lower edge of the cloth supports a smooth ring of glass, *b*, which has a channel formed in its lower surface. This channel proves an impassible barrier to the wingless female moth, and, consequently, no eggs can be laid above the point where the apparatus is attached. After the worm is hatched, if it attempts to climb the tree, the smooth, inverted groove presents an equally effectual barrier to his progress.

The glass ring is made in two sections, and is secured to the cloth by a band, *a*, of iron, which is drawn together at its ends by means of a screw.

The worm that is so destructive to elms and other trees in this city and Brooklyn, though of the same genus as the canker worm, is of a different species, being named by Harris *Geometra niveosericearia*. The female moth of this insect is provided with wings, and she lays her eggs on the branches of trees, consequently an apparatus that would prevent moths and worms from crawling up the trunks of trees, would have no effect in stopping the ravages of our measure worm. But as the female moth of the canker worm has no wings, it is only necessary to cut off her course and that of her offspring up the body of the tree, to protect the tender foliage from their voracious and multitudinous maws.] We should therefore suppose that this apparatus must prove an effectual protection to trees from the ravages of the canker worm.

It was patented by Benjamin Merritt, Jr., of Boston, Mass., on the 15th of November, 1864, and further information in relation to it may be obtained by addressing The American Tree Protector Company, at No. 19 Phœnix Building, Boston, Mass.

The Steam Machinery of the Navy.

The following appears in the Washington correspondence of the *New York Herald*:—

THE REPORT OF THE NAVAL COMMITTEE.

The Naval Committee of the House of Representatives has just unanimously adopted the report of its chairman, Mr. A. H. Rice, on the subject of the resolution introduced during the last session by Winter Davis, on the condition of naval machinery built by Mr. Isherwood, the Chief of the Bureau of Steam Engineering; the causes of the failure of the machinery of the Pensacola, from the plans of Mr. E. N. Dickerson, and the administration of the engineering department of the navy, including the sweeping charges of fraud and incapacity. The resolutions were offered by Mr. Davis, at the instance of Mr. E. N. Dickerson, well known for his attacks in the newspapers and pamphlets on the Bureau of Steam Engineering and the Navy Department. The report of Mr. Rice is an elaborate one. The most searching investigation was instituted in both the management of the Bureau of Steam Engineering and the merits of the machinery constructed by it, the result of which, as given in Mr. Rice's report, is a complete vindication of its character in both respects. It shows the machinery to be up with the latest improvements, and that the mode adopted of using the steam, with a very moderate measure of expansion, is in accordance with the most recent scientific researches and practical experiments, and has the endorsement of all able and experienced engineers. The comparison of this machinery with that previously constructed for our navy, and for the French and English navies, and for the merchant marine, shows an incontestible superiority and a greater speed of vessels. The report also shows that the machinery of the Pensacola was renewed by the department only after the most earnest endeavors to make it so far successful as to admit of use with the slowest admissible speed of a vessel. An examination of over forty witnesses failed to give any color, even the slightest, to the charges of fraud and incapacity; but proved, on the contrary, that the Government interest could not possibly have been better protected, both as to cost and character of the machinery.

Interesting to Physiologists.

In a letter to the London *Globe*, Dr. Kidd mentions the following instance of the restoration of sight in a young women born blind. He says:—"I saw individually, and observed with interest, the following case a short time ago at the Eye Institution, Moorfields—a case that would be invaluable to Berkeley, as bearing on the part played by the senses in intellect, etc. An interesting-looking young woman, twenty-two years of age, born stone blind—partly educated in the family of a clergyman, all this time by finger alphabets, as we see blind men tracing the letters in one or two places in town—blind for twenty-two years, was restored to perfect vision in four days by a surgical operation, and to partial vision in two minutes. This young woman in an instant, having been twenty-two years and from her birth stone-blind of congenital cataract, began to see, as these deaf mutes in Paris begin to hear for the first time. The effect in the young woman was most curious, and something of this kind. She saw everything but there was no idea whatever of perspective. She put her hand to the window to try to catch the trees on the other side of the street, then in Moorfields; she tried to touch the ceiling of a high ward; she was utterly ignorant also of common things—*e.g.*, what such things as a bunch of keys were, of a silver watch or a common cup and saucer; but when she shut her eyes and was allowed to touch them (the educated sense) she told them at once! She could almost distinguish the greasy feel of a silver half-crown from the cold, dry harsh feel of a copper penny. Her joy was excessive when shown some mignonette and sweet pea that one of the surgeons had accidentally in his coat, for it seemed she knew all the plants in the clergyman's garden by the touch and smell! She looked at the bunch of keys, and with equal blankness at the flowers, then shut her eyes so as to recognize

them. All this took up less then five minutes. But she failed to say, as well as I now remember the case, these are flowers. But on my saying when she opened her eyes again "why, these are flowers." "Oh! so they are," she replied, shutting her eyes again quickly and putting them to her nose, "This is mignonette," etc.

CONDITION OF NEW YORK MACHINE SHOPS.

We have recently visited the leading machine shops in this city for the purpose of ascertaining the quantity of work on hand for the ensuing year, and were surprised to find them generally dull. The great bulk of the Government work, on new steamers and frigates, has been done, and the shops are finishing up their old contracts preparatory to taking others. At the—

ALLAIRE WORKS

is building the *Madawaska*, a government frigate, having cylinders 100 inches diameter and 4 feet stroke. These engines are from designs by Capt. Ericcson, and are built on a peculiar plan; they are perfectly balanced and expected to obtain a high rate of piston speed. The North River steamer, *Francis Skiddy*, is receiving new boilers and having a general overhauling done to her engine.

A new beam engine for a ship soon to be launched by Mr. Westervelt is in progress; it will have a cylinder 56 inches in diameter by 11 feet stroke, fitted with Herman Winter's rotary cut-off. A beam engine of 90 inch cylinder and 12 feet stroke has just been completed; also one beam engine 68 inches diameter and 11 feet stroke for steamer *Orient*. The engine of the steamer, *City of Buffalo*, formerly on Lake Erie, has been transferred to the steamer *Moro Castle*, running between this city and Havana; several gunboat boilers are also building. At—

PEASE AND MURPHY'S.

Very little is doing beyond repairing and building a number of boilers. At the—

ETNA IRON WORKS.

The steam ram *Dunderberg*, building by William H. Webb, Esq., is receiving her machinery. The shaft and propeller are in place, and the rest of the engine is in various stages of progress. They have also at these works a pair of engines for the Government; the cylinders are 100 inches diameter by 4 feet stroke, also three pair of propeller engines 60 inch cylinders by 36 inches stroke for Government sloops of war.

Also one beam 100 inch cylinder and 12 feet stroke for steamship *Day Star*. At the—

NEPTUNE IRON WORKS

there is one beam engine building having a cylinder 85 inches diameter by 12 feet stroke of piston, for the China trade; also one 66 by 12, for the same.

This concern has just completed one beam engine of 60 inches diameter in cylinder by 12 feet stroke, for an English firm in China.

For the last ten years our American engine builders have been building machines for steamers in the China trade almost as fast as they could send them out. Messrs. Boardman, Holbrook & Co., of the Neptune Iron Works, have built 15 engines of large size, and numerous others have been sent out there by different parties, so that by this time the waters of the China sea, and rivers tributary thereto, must be pretty well covered with specimens of our handiwork.

MORGAN IRON WORKS.

The above firm have two engines 60 inch by 11 feet stroke for the Mexican Mail S. S. Company, and four beam engines 44 inch cylinder by 11 feet stroke, for parties not named; also one government frigate engine 100 inch cylinder and 4 feet stroke.

The *Idaho*, a government vessel, is also building here. The engines are from designs by Mr. E. N. Dickerson, and have cylinders 36 inch diameter by 8 feet stroke. The cylinders four in number set athwart-ships, one pair on each side of the keel. There are two screws one under each quarter, and a high piston velocity, no less than 800 feet per minute, is expected to be obtained. This vessel has peculiar boilers, also by Mr. Dickerson; they have been tried and found to make steam rapidly.

A New Use for Castor Oil.

A gentleman whose attention had been directed to the use of castor oil as a dressing for sheep, says the *Dublin Agricultural Review*, called here the other day in order to state a fact regarding the use of castor oil which he considered might be of service to the public.

Some time ago our informant was secretary to an orphan institution, where a large number of children were educated and boarded on the premises. That annoying disease, ringworm, broke out amongst them, and, notwithstanding all the efforts of the medical men connected with the institution, it could not be got under. When matters were in this state, a tradesman, who was employed upon some repairs in the house, told the matron that his children had been cured by an application of equal parts of castor oil and train oil. The remedy was simple and easily tried; and the result was that in a very short time not a trace remained of the disease among the children. The two oils were mixed together and applied daily.

Such is the substance of the information we received and we hope it will be found useful wherever an occasion arises requiring to put it in practice.

Rules for Finding Gears to Cut Given Threads.

Mr. W. B. Hatch, of Utica, N. Y., furnishes the following rule for cutting screws in engine lathes:—

RULE.—Divide the number of threads to cut by the pitch of feed screw; the quotient will be the ratio of the two wheels. If the ratio be a fraction, select for a driver a wheel into which the denominator will divide even, and multiply the driver by the ratio, the product will be the wheel driven. If the number of threads to cut be less than the pitch of the feed screw, divide the feed screw by the thread to cut, and reverse the position of the wheels.

Examples.—1. To cut 14 threads, feed screw 8, $14 \div 8 = 1\frac{3}{4}$, the ratio; the denominator, 4, will divide even in 20; then $29 \times 1\frac{3}{4} = 35$ for wheel driven.

2. To cut $19\frac{1}{2}$, feed screw 8. $19\frac{1}{2} \times 8 = 2\frac{7}{16} = 78$ for wheel driven.

3. To cut 3, feed screw 8. $8 \div 3 = 2\frac{2}{3}$. 3 will divide even in 21; then $21 \times 2\frac{2}{3} = 56$, and by reversing the position of the wheels, we have 56 for driver and 21 for wheel driven.

In cutting a screw in a lathe the feed screw forms one term of a ratio, and the thread you wish to cut forms the other term. The driving wheel represents the term formed by the feed screw; the leader or wheel driven represents the thread to cut. It is evident, therefore, that the number of teeth on the driver must be a multiple of the feed screw. The number on the leader must be a multiple of the thread to cut, or it must be a multiple of the prime factors of the terms which it represents. For example: to cut 14 to the inch, unless your feed screw is a multiple of 7, the prime factor in 14, your leader must be a multiple of 14 or 7. It is evident, also, that if you preserve the ratio it is immaterial how much you increase or diminish the numbers representing its terms, we may therefore multiply or divide both terms by the same number and preserve the ratio.

Example—Let 7 and 8 be the terms of a ratio; we see that 7×6 and 8×6 have the same relation, as also $7 \div 6$ and $8 \div 6$. We may thus vary at pleasure the number of teeth in our gears, being careful to preserve the ratio.

It is sometimes necessary for double-geared lathes to form two ratios which shall equal the one given. This may be readily done by multiplying both terms by any easy multiplier which will enable you to divide the products and thus obtain two wheels to represent each term

Example—Terms of ratio 8 and 7; multiply both by 100. $8 \times 100 = 800$, and $7 \times 100 = 700$, then $800 \div 40 = 20$; giving 40 and 20 for one pair of wheels, and $700 \div 25 = 20$, giving 35 and 20 for the other pair.

From these general principles we may derive the following rules for single and double-geared lathes.

For Single-geared Lathes.—Multiply the pitch of the feed screw, and the thread you wish to cut by the same number, using any number which will produce such gears as you have, the product by the feed screw will be the driver; the product by the thread to cut will be the leader. Or you may select for your leader a wheel which is a multiple of the thread you wish to cut; divide the number of teeth by the thread to cut, and multiply the quotient by the pitch of the feed screw; the product is the driver.

Example—To cut 9 to the inch, feed screw 5. $9 \times 5 = 45$ for leader, and $5 \times 5 = 25$, for driver. Or by rule second; leader $45 \div 9 = 5$: then the quotient 5×5, feed screw, $= 25$, the driver.

NOTE.—For fractional threads you may reduce both terms to improper fractions with equal denominators, then proceed with the numerators as with whole numbers.

2. To cut $9\frac{1}{2}$, feed screw 5. $9\frac{1}{2} = 19 \div 2$ and $5 = 10 \div 2$, then $19 \times 2 = 38$, leader, and $10 \times 2 = 20$, driver, or $19 \times 3 = 57$, leader, and $10 \times 3 = 30$, driver.

3. To cut $7\frac{3}{4}$ feed screw 8. $7\frac{3}{4} = 31 \div 4$, giving leader 31 and driver 32.

For Double-geared Lathes.—Proceed as in rule first for single geared lathe, only using a larger number for a multiplier, then divide the product found by the thread to cut, by any wheel which is a multiple of that thread, which will divide without a remainder, the divisor is one leader, the quotient is the other; then divide the product found by the feed screw by any wheel which is a multiple of the feed screw which will divide this product without a remainder the divisor is one driver, the quotient is the other.

Example—To cut 29, feed screw 8. $29 \times 100 = 2900 \div 58 = 50$, and $8 \times 100 = 800 \div 40 = 20$, getting 58 and 50 for leaders, and 40 and 20 for drivers.

2. To cut $11\frac{1}{2}$, feed screw 5. $11\frac{1}{2} \times 200 = 2300 \div 46 = 50$ and $5 \times 200 = 1000 \div 25 = 40$.

3. To cut $\frac{1}{2}$ thread, feed screw 4. $\frac{1}{2} \times 800 = 400 \div 20 = 20$, and $4 \times 800 = 3200 \div 64 = 50$.

NOTE.—In the above examples I have used 100, 200 and 800 for multipliers, simply because they are easy and convenient. If your change wheels are larger or smaller, use any number for multiplier which will produce the desired result.

W. B. HATCH.

Utica, Jan. N. Y.

[In our own practice we have always been cautious about relying on any rules until we have proved them. It is one thing to figure a train of wheels to cut a given thread, but it does not always follow that the result obtained by calculation is the true thread. In even numbers there is scarcely a chance for error, but with fractional threads, old lathes and leading screws cut in a hundred different shops, it is best to try every rule on an old piece of iron before executing the work in hand.—EDS.

A New Source of Iodine.

The *Mechanics' Magazine*, speaking of new sources of several rare substances, says:—"Another interesting example is the discovery of a mineral source of that very valuable substance, iodine. The ocean is the great storehouse of this element, all sea-water containing the iodides of sodium and magnesium, but only in such small relative quantity that to extract iodine directly from sea-water is not practicable, and hence sea-weeds, which have the power of attracting it from the element in which they live and assimilating it into their own substance, have hitherto formed the sole commercial source of it. Chemists have been aware of its existence in certain Mexican silver ores, in various land plants growing near the sea, in sponges, and in the oil of the liver of various fishes; but none of these bodies, animal, vegetable, or mineral, contains it in such quantities as would pay for extraction. There is said, however, to have been lately discovered in Chili a mineral consisting of a mixture of iodide of lead with the oxide and chloride of that metal in such proportion as to contain ten per cent of iodine. This mineral is believed to exist in considerable abundance, and if it really does so a great reduction in the commercial price of iodine must be a speedy result of its discovery. Such a result would be a great boon to the art of photography, and also to that of dyeing, since the brilliant dye recently discovered by Dr. Hofmann, though the first, will doubtless not be the last, having this element among its constituents.

LIEBIG, the celebrated German chemist, has gone to London to superintend the application of the sewerage of London to the purposes of agriculture. Millions of dollars' worth of manure are annually wasted in that and other large cities, and the land robbed of its natural fertilizers by neglecting to secure the drainings from large and populous places for manures.

Correspondence

Peat as a Fuel.

MESSRS. EDITORS:—Our attention has been called to an article in the *Artisan* on the subject of "Peat as Fuel." Judging from our own experience, the statement made is calculated to mislead the public by attaching a greater value to it, as fuel, compared with other kinds of fuel, than facts will justify.

The writer of that article says:—"Peat is selling here (Boston) freely at $9 per chaldron, and is actually preferable to the best cannel coal."

We should regret to say one word to discourage its use, and we have once before, through your paper, called the public attention to the use of peat as a valuable fuel, and suggested that there were large quantities of it throughout the New England States where it was hardly known. We commenced using it about eight years ago for annealing our iron wire. Since that time we have taken out of our meadows and applied to various uses in our works seven thousand cords. This large consumption has, perhaps, enabled us to speak on the subject of its relative value, compared with other fuel, as advisedly as those who have had but a limited experience. During all these years we have been burning coal, wood and coke in quite as large quantities. We have made repeated experiments to determine how it would compare with these different kinds of fuel, and the result has been that eighty bushels of peat would produce about as much heat as one cord of chestnut or hemlock wood.

It should, however, be remembered that there is a difference in the quality of peat in different localities. Our peat will average as good as any which we have ever seen in this country. The writer, while in Ireland, examined the peat of that country and found it, as well as could be judged, fifty per cent better than ours.

We have tried all the different modes for taking out and preparing peat or use—as cutting out with a common peat knife and leaving it to dry in the sun while the pieces were standing on one end; the pieces were cut about five inches square, fourteen inches long. We have also made what is called hand peat—a very tedious process—without much increasing its value. The process of pressing we have tried to some extent; this, too, will not pay unless for some purpose requiring a much greater density than is required for ordinary use. The first-named process is by far the most economical and in every way as good. We have invested in this department of our business ten thousand dollars, and have kept an account of its cost, so that we are prepared to say what our peat has cost. Not reckoning anything for the depreciation of our meadows, which cost, on an average, seventy-five dollars per acre, we find as the result, that the peat, carted two and a half miles to our works, dried and prepared for the furnaces, has cost us on an average 3½ cents per bushel as wages were before the war-prices commenced: since then 5 cents per bushel. We have been much disappointed in the value of the ashes. At first we sold them at about two cents per bushel; since the value of them has been tested for agricultural purposes, the farmers will not take them away as a gift.

WASHBURN & MOEN.

Worcester, Mass., Dec. 19, 1864.

New Plan for a Gas Engine.

MESSRS. EDITORS:—Will you inform me through your columns whether any use can be made of gas from water for heating purposes—not light? Will such gas give heat if passed through a coal fire, as in a furnace on steamers or in a house stove? There is no doubt that the thing can be accomplished, but in what manner? Also, whether or not petroleum and other oils and fatty matter can be used as motive power by placing the same in a boiler, thus making a gas—which we know will burn—and passing it to a place under the boiler, to burn it the same as coal? Coal placed in a boiler will give power as steam, and the gas thus made can be used to heat the boiler, thus saving great expense. PETROLEUM.

[Water is composed of hydrogen and oxygen, in the proportion of 1 pound of hydrogen to 8 of oxygen. If water, in the state of superheated steam, is brought in contact with red-hot charcoal, it is decomposed, the oxygen combining with the carbon of the coal, and the hydrogen being set free in the form of gas. Hydrogen, in burning, produces the most intense heat of any substance known, and it is in all respects the best fuel, being perfectly clean, and the product of combustion being pure water. But there is just as much heat directly absorbed or destroyed in decomposing the water as is afterward generated in burning the hydrogen, and there is, beside, a good deal of heat incidentally lost in the operation. There is, therefore, no economy of heat in decomposing water and then burning the hydrogen.

The suggestion in regard to working petroleum vapor through a cylinder, as steam is worked in a steam engine, and then burning the vapor, is novel and ingenious. If the price of petroleum should fall to about four cents per gallon it might be well to try this plan.—EDS.

Petroleum in Central New York.

MESSRS. EDITORS:—I have been spending some time in the central part of New York State and found there gas springs. The soil and the shale rock, and in fact, all the rocks in their neighborhood, are strongly impregnated with a benzine or petroleum odor. The gas will ignite on presentation of a lighted match. As your opinion may guide me in acting, I would ask, does this gas indicate beds of petroleum, or does it proceed from coal strata or beds of bitumen? J. L.

[These signs are certainly proof of the existence of petroleum in the locality, but they are no evidence of the existence of those caverns or cavities in the rocks which are essential to the accumulation of the oil in quantities sufficient to pay for boring,—EDS.

Holes in Glass.

MESSRS. EDITORS:—I saw, recently, in your "Notes and Queries," directions given for drilling glass. If you take an ordinary drill, well tempered, and instead of using oils, water, or camphene, wet it with coal oil or benzole, you will find it will cut glass about as rapidly as it would steel. I have drilled into the edge of a window-glass to the depth of one inch in fifteen to twenty minutes, frequently. If you wish to drill through the glass, it should be countersunk on both sides before the drill is started, as that prevents the drill from scaling the edges as it goes through. The best tool for countersinking is a drill dressed off at the point like a very flat three-sided pyramid. The same fluid will give a bite to a file that will make it cut very well for a while. J. J. B. HATFIELD.

Indianapolis, Ind., Jan. 26, 1865.

[The statement above has been frequently printed, but it does not apply generally, and we therefore print this correspondent's letter as a matter of public interest. Any anti-lubricating fluid aids the drill in penetrating, and turpentine, benzine, naphtha, have been successively used for the purpose. We have tried benzine on common lime or bottle glass, and find that a hole can be made with a common drill, but we have had no success with flint or plate-glass, and doubt if a hole can be made with a common drill in it.—EDS.

Glycerine for Gas Meters.

MESSRS. EDITORS:—The present high price of Alcohol and other spirituous liquors, which have till now been used for filling wet meters to prevent them from freezing up, has become the strongest inducement for gas companies, gas fitters, and consumers, to give glycerine a fair trial for their purpose. The prejudice and distrust generally prevailing are gradually giving way under the many proofs that glycerine is preferable to any other fluid as a non-freezing substance. Besides the cheapness of this article (being only about ⅓ the price of alcohol), its other properties especially recommend it for the meters. As a neutral fluid it has no corroding effect on the metal of the meters, not being crystallizable, nor coagulating at a temperature near the freezing point of mercury, it will neither evaporate nor congeal at any temperature within these two extremes of the thermometer. Its non-freezing power decreasing in proportion to the quantity of water added to it; it can be easily adapted to the lowest temperature of any climate. A mixture, for instance, of two parts of glycerine and three parts of water will not freeze at twelve degrees below zero, Fah.; one pint to three pints of water not at twenty degrees below zero, and equal parts of glycerine and water will stand a temperature of six to seven degrees below zero. Glycerine reduced to this latter proportion is now extensively used by gas companies and gas fitters in the country and this city, where it has been introduced by Mr. Paul Balluff, of 95 Maiden Lane, the agent for Messrs. Hartmann & Laut, manufacturers of glycerine, in Cincinnati, whose advertisement appears in your paper.

It is generally sold in the concentrated state, and is left to the purchaser to dilute with an equal, or, if desired, with a less quantity of water.

G. P.

New York, January 31, 1865.

Pump Freezing.

MESSRS. EDITORS:—A very simple, practicable and economical expedient for preventing the freezing of pumps in exposed situations, consists in throwing in at the top of the pump each evening when there is reason to apprehend danger, a small quantity of brine, say a quart or less, and as it runs out at the spout catch and throw it back a few times so as to mix it with the surface water. In extremely cold weather plug the spout and fill straw in the handle-mortise, and you will effectually ward off an evil which incommodes many families in winter. Indeed, it is no uncommon thing for pumps in cisterns and wells in certain locations, to freeze so as to be of no further service until spring, or a general thaw restores them. A SUBSCRIBER.

1st month, 1865.

The Telegraph and the Weather.

The editor of the *Mechanics' Magazine*, in a summary of the news of the year, remarks:—"The electric telegraph is likely to render us henceforth a service which it has not until now been known to be capable of. For some time past it has been systematically employed, in this country at least, to transmit to one center meteorological observations made at a great number of widely scattered points, and to transmit from that center predictions founded on these observations; but Father Secchi, the famous Italian *savant*, now informs us that a line of telegraph wires itself constitutes a better indicator of certain kinds of meteorological changes than any other we as yet know of. All persons at all familiar with electric telegraphy are aware that currents other than those proceeding from the batteries employed are constantly passing along all lines of telegraph wires. They are derived from either the earth or the atmosphere, and are called 'earth-currents.' They are subject to great variations, which Father Secchi and some of his friends have for some time past been carefully studying, with the result, among others, of finding that, whenever the earth-currents are more irregular than ordinary, bad weather invariably follows, the degree of their regularity of the earth-currents bearing always an exact relation to that of the storminess of the weather which they precede. We are certainly progressing as regards our power of forecasting meteorological changes."

"Atlantic Monthly."

The *Atlantic Monthly* for February is a capital one. The House and Home Papers by Mrs. H. B. Stowe, which were so popular in the last volume, are continued in the current volume under a new title. "Dr. Johns" is the name of a new story just commenced, by Donald G. Mitchell, or Ik Marvel, as he is known to readers of the "Reveries of a Bachelor." "A Fortnight with the Sanitary," gives an interesting review of the aims, objects and obstacles it has to encounter, and several other miscellaneous papers on topics of general interest fill out the number.

The *Atlantic* has taken one step backward, however, in using antique type of a style long ago discarded as inelegant, obscure, and trying to the eyes. Modern type are far handsomer and clearer than those our grandfathers used, and the change from lively to severe is an improvement in the wrong direction.

MONTAIGNE, the celebrated French essayist, whose clear style, as well as vigor of thought, has been the praise of good critics the world over, made his boast that he never used a word that could not be readily understood by anybody in the Paris markets.

AN AGRICULTURAL MUSEUM AT WASHINGTON.

The *National Intelligencer* enumerates some new objects of interest in the Agricultural Museum in the basement of the Patent Office, which were also brought to our notice during our recent visit to Washington.

Among these new objects were two clusters of raisins of extraordinary size, grown and cured in California. They were presented to the Land Office, by the Hon. J. Conness, United States Senator from California, and by the officers of that bureau deposited in the museum. The largest of these clusters has one hundred and seventy-five berries upon it, and the smallest one hundred and twenty. These are fit "companion pieces" for the mammoth "four-pound pear," also from that fertile region, and to be seen in the same Department.

Some very rich samples of sirup have been added to the sorghum shelf within a day or two past, the product of New Jersey soil and manufacture. This sorghum business is increasing in some sections to an extent of which the country at large is scarcely aware. It threatens to drive West India molasses out of the market altogether, and, indeed, has already done so in many portions of the Western States. A gentleman from southern Illinois stated in the Department a few days since that he alone had seven hundred barrels of the sirup for sale the past fall, and that it was fast becoming the universal sweetener of the entire West.

An addition has been made to the fiber collection of several fine specimens of flax contributed by Michael Fryer, Esq., of Wilmington, Delaware; and to the farmyard stock of a beautiful Cotswold lamb of eight months, with a fleece some ten or twelve inches in length; also, a pair of black Spanish fowls.

We notice, also, a curious sample of vegetable velvet, made of the common cat-tail flag, under a patent recently taken out by some gentlemen of this city. We understand that plush, furs, and velvets, of excellent quality and of various colors, can be made from the same material by the patentees' process of supplying a back-ground or skin of some india-rubber preparation.

It is gratifying to see the rapid increase of interest in this newly-established cabinet. The nucleus once formed draws contributions from all parts of the country; and what has been done within the past five months shows what a magnificent collection might have been secured had the museum been instituted from the commencement of the Department.

Mr. Glover's specimens of stuffed birds and fowls, also of artificial fruits, are objects of much interest to all who visit this Department. Mr. Glover has also collected a valuable amount of information concerning the insects and diseases that prey upon fruits, which ought, in some form, to be published for the benefit of the people. It is a subject worthy of the attention of Congress, and an appropriation ought to be made for the purchase of Mr. Glover's rare and valuable collections.

THE PNEUMATIC LOOM.

We recently mentioned the invention, by Mr. Harrison, of England, of a loom in which the shuttle is driven by a jet of compressed air in place of the pickers now in use. The last number of the *Mechanics' Magazine* contains the following description of this loom. The statement that $\frac{5}{7}$ of the whole power required to drive a loom is saved by this invention seems to be incredible, for we should not suppose that this proportion of the power is expended in driving the shuttle by the present method :—

"Each 'pick,' or 'stroke,' is produced by a jet of compressed air, which is discharged from the valves of the shuttle-box, upon the end of the shuttle, and drives it with great rapidity to the opposite box. In the power loom the average rate of speed is about 180 picks or strokes per minute, while in the pneumatic loom the speed is at least 240 strokes per minute. The new loom possesses many advantages over those in present use. A greatly increased productiveness is attained at a less expenditure of power. No accurate data has at present been obtained as to the power required for working the respective machines, but according to the inventor's returns the proportion in favor of the pneumatic over the ordinary loom is as 13 to 8. This is confirmed by actual experiment, for while it required nearly the whole power of a man to move the old machine, the new loom could be moved easily with one hand on the bar. The force required to overcome the tension of the spring attached to the shafts of the levers or arms in the loom, and the amount of resistance offered by the pickers as they traverse the spindle, is wholly avoided in the pneumatic loom. The shuttle is also much lighter and consequently easier to work. Another advantage is, that the work produced is of an improved quality. This is owing mainly to the flight of the shuttle being in a mathematically true line, and to its being uninfluenced by the propelling force from the lever arms. No vibration is imparted to the frame in the combing up of the weft, and every thread is laid perfectly even. It is said a saving of about 30s. is effected in the first cost of the loom as against the cost of those on the old system, and this includes the addition of all the parts necessary to give effect to the atmospheric system. But this, according to the inventor, is not all. The important item of wear and tear is subject also to considerable reduction. Mr. Thomas Page, C. E., has examined the new loom, and reports very favorably upon its merits. He estimates a saving of not less than £2 per loom per annum will result from the adoption of the pneumatic principle. The method of applying the compressed air is very simple, consisting of an air pump, which forces the air into a cylinder, whence it is conducted by pipes to each loom. A flexible pipe connects the tube in each loom with a service pipe under the floor, and with each revolution of a wheel, with a graduated cog, a small valve is raised which admits the air into the shuttle box at either end as required. The other working portions of the loom are in all respects similar to those of the ordinary one."

Petroleum as Fuel for Raising Steam.

Mr. C. J. Richardson, an Englishman, has been making several experiments with petroleum for fuel, and gives the result in an interesting letter to the London *Oil Trade Review*. We copy:—

The result of the experiments with my grate at Woolwich Dockyard has more than fully confirmed the value of the oil above coal for steam fuel, as first proved by my experiments at Chelsea. Several of the naval engineers who saw the grate said it was much too small to get up steam, its superficial contents being only two feet. It was placed in position under the boiler of a powerful steam hoisting engine of fourteen horse-power, capable of being worked up to 24 h. p.; the size of its coal grate was nine feet super. With the water cold at starting, and with a consumption of only five gallons of oil, in two and a half hours it caused the steam to blow off fully; one half-hour of the time the valve fixed at 10lb. pressure. The grate of thin cast-iron, in four separate pieces, was not sufficiently strong to bear the pressure, which was fully equal to 25lbs., and, as it indicated weakness, I drew off the oil, about one gallon, five having been supplied. If the coal grate had been reduced to two feet super, I question whether it would have done as much in eight or ten hours. I submitted to the engineer of the yard drawings for a wrought-iron grate, to be fixed to and make part of the boiler; and I have been requested by the Admiralty to send these drawings to Woolwich for estimates to be made, so that it should be tried on a large scale. The drawings I left there this morning.

It was in your paper that I first saw the report of Professor Fisher, of Newhaven, speaking so strongly as to the absurdity of petroleum competing against coal as steam fuel; other analytical chemists of equal eminence in England have followed suit. Immediately a notice appeared in the *Times* of the experiments at Woolwich came a letter, stating that "a very slender consideration of the character, composition, and cost of petroleum would be sufficient to show the impracticability of using it as fuel in such a case. The heating power of petroleum is certainly higher than that of coal=1·5 : 1·0. But the price of petroleum varies from 15*l*. to 20*l*. per ton. . . . Now, these facts will be sufficient to convince any one of the impracticability of using petroleum as a substitute for coal in steam vessels, quite independently of any contrivance as to the mode of burning." Almost the words of Professor Fisher. I received a letter from an eminent engineer (in the early stage of my experiments), whom I had asked to view the process, almost in the same strain; this gentleman I afterwards found was the owner of some valuable patents entirely dependent upon the use of coal as steam fuel. I can well imagine that when petroleum comes into use instead, it will cause some considerable jealous excitement. Coal mines and their monopolies are too valuable a property to let slip without a struggle. My answer to Professor Fisher, and all analytical chemists, is this: If coal could be fully utilized, their statements would be correct, but it cannot; through the present system of rapid firing one half the fuel goes off in heavy black smoke, owing to the impossibility of supplying sufficient air to effect the combustion of the gases the coal gives off when heated. By careful firing and the use of the Argand furnace, the entire prevention of smoke can be obtained, and the fuel be more fully utilized. But there is a prolific cause of waste, which is beyond the power of any Argand furnace or careful firing to cure. Coal can only be burnt by supplying it with a strong draught or current of air; it requires a tall chimney—the taller the better, because the quicker the draught. This current of air must be formed before the coal is put into the furnace; large logs of wood are fired, the furnace doors being kept open; when the coal is put in a welding heat is often obtained through the quickness of the draught. The office of the tubes and flues in the boiler is to obtain as much heat as possible from the passing current, going several hundred cubic feet per minute. When the current of heated air enters the chimney funnel it represents waste heat, and is never less than 600° F. In a late work by Mr. Wye Williams, no second authority on this subject, entitled, "On the Steam Generating Power of Marine and Locomotive Boilers," he details three careful experiments as to the best form of boiler to obtain the greatest amount of heat from the fuel. He gives the temperature of the waste heat to the first experiment (he calls them properly "the escaping products in the chimney,") as 1060°; to the second, 760°; and the third, 635°; and this, be it observed, with the consumption of only 3 cwt. of coal to each experiment. I should like Professor Fisher to give us the temperature of the waste heat in the chimney of a furnace burning from 20 to 30 tons of coal per day. We know the current is so strong that it often carries up small coal and cinders along with it; that the heated gases often take fire by a spark from the furnace, and burn at the top of the funnel with a fierceness almost equaling the flame from a blast furnace. Is this flame or waste heat employed in creating steam? and how much is the coal utilized? If we place the figures thus—petroleum=1·4, coal=0·4, it would very likely be too much in favor of the coal. We shall never fully learn the wicked waste we are now making of this valuable fuel until petroleum supersedes it, which it certainly will do within a few years.

Ship Canal around Niagara Falls.

On the 1st of February the U. S. House of Representatives passed a bill providing for the construction of a ship canal around Niagara Falls. As we go to press it has not yet passed the Senate.

FUEL.—An invention, by Mr. John Milnes, of Gloucester, England, consists in taking peat and mixing it with culm, slack, small coal, coal brash, or refuse of coal, which he prefers to be mixed in equal portions, and the same may, if required, be squeezed or pressed into compact masses or blocks, and will then be fit for use as fuel, and be much improved in quality. He can also mix peat with coal brash, and the earthy substance found with it, or with clay.

CORNISH PUMPING ENGINES.—The number of pumping engines reported for Nov. is 35. They have consumed 1928 tons of coal, and lifted 14·4 million tons of water 10 fathoms high. The average duty of the whole is, therefore, 50,300,000 lbs. lifted 1 ft. high, by the consumption of 112 lbs. of coal.

THE scientific world of Paris is much occupied by the experiment which M. Graof intends making in a few days of flying from the towers of Notre Dame by his new machine. He undertakes to remain suspended in the air with as much ease as a bird. Let him read the story of Icarus, and beware.

Improved Coal Scuttle.

This coal scuttle is intended to effect the object for which such articles are intended, by discharging the coal through an aperture at the bottom, thus avoiding, says the inventor, the dust caused by pouring over the top. The scuttle is allowed to rest on the stove, and the bottom slide, A, withdrawn; the coal is then discharged through the bottom, as before mentioned. In Fig. 2 the oblique line, B, shows an inclined bottom, which conducts the coal to the aperture and allows all of it to be let down to the point of discharge. A set of legs or short knobs can be placed on the bottom to prevent the slide from being jammed when set on the floor or a base, C, as shown in Fig. 2. These scuttles can be made of any desired style and size, and for many purposes will be found useful. The invention was patented on the 13th of December, 1864, by George Chambers, of Ithaca, N. Y. The inventor will dispose of the patent, or enter into negotiation with parties to manufacture.

Fig. 1

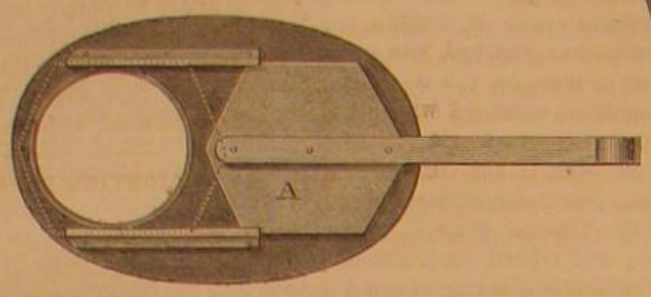


Fig. 2



CHAMBERS'S COAL SCUTTLE.

Sharpening Needles by Electricity.

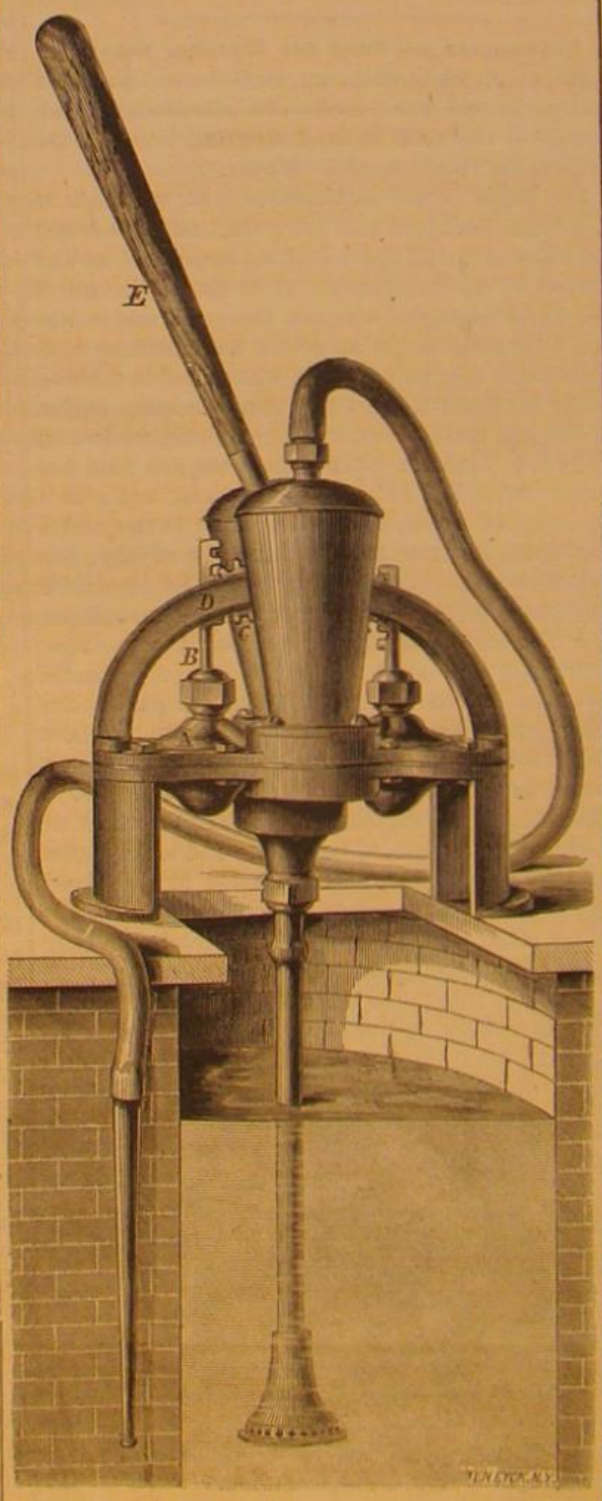
A practical application of electricity in an altogether new direction has just been made by a telegraphic engineer at Lausanne, and seems really to promise very valuable results. Mr. Cauderay, the gentleman in question, has found that the electric current is capable of performing readily and cheaply an operation which, as practised hitherto, has been one of the most unhealthy within the whole range of the industrial arts, namely, that of sharpening the points of pins and needles. He first observed that if a thin wire connected with the negative pole of a galvanic battery, and so forming a negative electrode, be passed through its bottom into a vessel containing water slightly acidulated, and another similar wire connected with the positive pole of the battery, and so forming a positive electrode, enter by the mouth of the vessel, and pass down into the acidulated liquid until its point is within the sixteenth of an inch or so of that of the negative wire, each wire being placed vertically, and the one exactly above the other, the circuit will be completed. Although the battery may consist only of a single cell, by the aid of the small quantity of acidulated liquid between the extremities of the two electrodes, a current will thus pass, and within a few minutes the lower extremity of the upper wire or positive electrode will have become perfectly conical, the fineness of the point of the cone depending on the thickness of the wire, the metal it is made of, and the particular acid used. Experiments suggested by this observation resulted in the discovery that precisely the same phenomenon would occur in the case of each, if, instead of a single wire, a bundle consisting of a great many wires were used as the positive electrode. The applicability of this discovery to the sharpening of pins and needles as a manufacturing process, seems to have been thoroughly tested, and we are told that the pointing of these implements by electric agency requires so little battery power when practised on the great scale, that it is materially cheaper than the old method of pointing them, while the points obtained are much more perfect than have ever been got by grinding. That tedious process, the fine metallic powder disengaged during which is so injurious to the workmen engaged in it, despite all the precautions they can take, would thus seem to be really doomed at last.—*Mechanics' Magazine.*

WHY FLANNELS BECOME DAMP.

An old housekeeper asks us why her flannels become damp while they are packed away in her drawers. In some cases it is doubtless owing simply to a change in the temperature of the air with which they are confined. Warm air will absorb and retain more moisture than cold air. Summer air contains a great deal more water than winter air of the same apparent dryness. If flannels are packed away in the summer, they are surrounded, and all their interstices are filled, with warm air; then if the air is cooled, it loses the power of holding the whole of the water which it contains, and a portion is deposited on the flannel. Prof. Henry found that a cubic foot of air if saturated with moisture at zero will hold half a grain of water, and at 100° will hold 19¾ grains.

ROWES'S DIAPHRAGM PUMP.

This pump is constructed on a novel principle. There are no buckets or pistons in it, and the necessary vacuum in the barrel is obtained by the alternate action of a diaphragm, confined between two plates. These diaphragms, for there are two, one in each chamber, A, are attached to the rod, B, said rod having a rack on the upper end which gears in a pinion, C, set in the guard, D. The pinion further gears in the lever, E. When the latter is worked back and forth motion is communicated to the diaphragms, so that the air above and below them is displaced and water flows in as the result. It is very simple in construction and not liable to get out of order. As there is no piston or packing to be renewed, it will continue to work a long time without repair; for domestic use or for watering gardens, pumping liquids in factories, and in all situations where machines of this class are employed this will be found useful.



The patent was issued through the Scientific American Patent Agency on the 8th of November, 1864. For further information address P. C. Rowe, patentee, 594 Washington street, Boston, Mass.

THE CRANK MOTION.

We have just had a long conversation with two inventors who called to consult us in relation to a device for preventing the great loss of power from the crank motion. As some other inventors may be interested in the problem, let us say once more, there is no loss of power in converting rectilinear into rotary motion by means of a crank

When the crank is at right angles to the connecting rod of a steam engine, it is plain that the power of the steam is exerted to turn the shaft with the full advantage of the crank acting as a lever, but when the engine is near the centers, with the crank nearly parallel to the connecting rod, the power of the steam seems to act mainly to draw the shaft from its bearings, and with very little tendency to make it turn on its axis. It is, therefore, not very strange that the idea should prevail to a considerable extent, that the engine operates at a great disadvantage, and with a corresponding waste of power, when the crank is nearly on the centers.

But when the crank is at right angles with the piston rod, a movement of the piston through one inch of stroke will move the crank only about one inch, while when the crank is nearly in line with the piston rod, a movement of the piston one inch will move the crank several inches. In this, as in other mechanical operations, what is lost in power is gained in time. With the proper diagrams it can be shown by geometric demonstration that a cubic foot of steam will do just as much work in one part of the stroke as in another.

This conclusion is subject to one qualification; the friction of a revolving shaft is in direct proportion to the pressure on its bearings. Very near the centers an inch motion of the crank is effected by a very small motion of the piston with a correspondingly small expenditure of steam and small exertion of force. In some cases the force is not sufficient to overcome the friction We once saw a ferry bridge smashed by the stoppage of the ferry-boat engine from this cause.

Artificial Fuel.—An invention has been patented, through Mr. Brooman, by Mr. F. C. Armelin, which consists in combining petroleum oil waste, or raw petroleum oil, cow-dung, coal-dust, and water, to form artificial fuel, the proportions of the ingredients being varied according as the fuel is intended for domestic, industrial, or locomotive and marine purposes.

Permits have been granted, it is said, by the Government to certain parties to cut cypress and yellow pine lumber in the State of Georgia. There is a very great demand for these kinds of lumber in the country at this time.

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NEW YORK, SATURDAY, FEBRUARY 11, 1865.

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BALANCED SLIDE VALVES.

A serious objection to the use of slide valves is the great power absorbed in operating them. When this detail of the steam engine is of any considerable size the evil increases to an injurious extent, so that the force required to work the valve is a large per centage of the whole power of the engine. Indeed, it is not unusual to see slide valves which have an area closely approximate to the total number of square inches on the piston, and if the nature of the work to be done were similar in both cases, the pressure on the piston would be balanced by that on the valve, and the engine would not move.

The result of this great labor on one part of the engine is followed by the rapid wear of everything connected to or with it. The eccentric straps of screw propellers are often made of wrought iron and bushed heavily with brass, so as to withstand the strain and to avoid heating caused by the excessive friction. The rock shafts are made unusually heavy, the valve stems much stouter, the journals larger and longer, and in fact each detail is very greatly enlarged so that it may be capable of performing the task assigned to it. Thus a larger amount of material is used than is needful, an increase in the cost of construction is apparent, expense in lubricating and repairs ensue, and the whole system is not only defective from an engineering point of view, but vexatious in its commercial aspect.

Aside from this defect, the slide valve when properly made, is one of the simplest and most effective devices ever invented for its office. If there were no remedies for the disease spoken of previously, the adoption of the slide valve, beyond certain areas, would be discouraged, but since the ingenuity of man has provided a way of escape, it is singular that so few interested parties avail themselves of it.

If we were temporarily made a power from which there could be no appeal, we should immediately fulminate an edict against parties using slide valves, and command them, on pain of large annual repairs, and manifest deterioration of their property, to apply some method whereby the pressure of the slide valve would be reduced to a rational amount; no greater than that due to the work required of it.

When the first invention to relieve the excessive friction of the valves was brought out it was a step in the right direction, but the attempts to introduce this valuable improvement have met with very little encouragement from those most interested. In the cases of large screw propellers which have engines working at high speeds it is absolutely necessary to divide, or take off the pressure on the valve face. Different methods have been adopted to do this. One of the simplest for low pressure engines is that invented by Messrs. Penn, of England. This consists in planing the back and face of the valve parallel and placing a brass ring between the back and steam chest bonnet so that the junction is steam tight. This ring covers only a portion of the area of the back, and therefore excludes the steam pressure from that area. A connection is maintained with the space inside of the ring and the condenser, which materially aids in restoring the balance, or reducing the friction of the valve on its face.

A striking effect of the utility of this contrivance, so far as relieving the pressure is concerned, was witnessed by engineers on the Italian frigate *Re d'Italia*. The condenser communication was shut off when the valves, stems and rods, although of ample dimensions, trembled violently, showing that the resistance to motion was very great. On restoring the connection the valves resumed their previous easy movement.

Another method is to attach a steam cylinder to the steam chest In this cylinder there is a piston which the main valve is connected to by links; when the steam is let into the chest it presses equally on the valve and the piston, between the two so that the pressure is taken off the valve in the ratio of the difference between its superficies and that of the piston. The piston has a slight reciprocating movement to compensate for the stroke of the valve. Vacuum may be maintained on the back of the piston so that by the combined force of the steam and the absence of back pressure on the piston the valve may be actually pulled off its seat. It is impossible to detail all the ingenious and practical devices for this purpose but it is manifestly proper that they should be universally adopted.

THE PATENT OFFICE.

We have heretofore spoken of the prosperity which attends the present administration of the Patent Office. Some statistics which we have recently obtained will be of interest not only to inventors but to the nation.

During the period of 8 years, from 1853 to 1860, the number of applications examined was 39,417—being an annual average of 4,925.

During the same period were patented 23,363—an annual average of patents of 2,920.

During the last four years, 1861 to 1864, the applications examined were 22,687—an annual average of 5,672.

During these four years were patented 15,761—an annual average of patents of 3,938.

This exhibit is highly gratifying when we reflect that throughout this latter period a civil war has been in progress, which has thrust its bloody fingers into every hamlet and brought waste and expenditure into every household. It proves that the rebellion has not broken the prosperity of our country, nor shaken the confidence of artisans and men of science in our future career. These two classes furnish the greater part of these inventions which are of intrinsic value, and their belief in Liberty and Union has never faltered. Even from the army and navy they send the results of their genius and studies. It is creditable to the gentlemen of the examining corps of the Office, as it is also to its administrative head, that with greatly reduced numbers they have accomplished such a vast amount of work.

In 1861, Commissioner Holloway, fearing a deficit, reduced the corps from 31 Examiners to 23. This reduction is fully justified by events, for the revenues of the Office are largely in excess of its expenses, and show a large surplus; and the statistics show that two-thirds of the old force have examined an average of 750 cases a year more than the full force examined. Each Examiner must have passed upon 246 cases annually during the last four years, against 159 cases during the preceding eight years. Every inventor is personally and deeply interested in the prosperity and faithful administration of the Patent Office, and in the industry and integrity of its Examiners and employees. And this exhibit will renew their confidence in the gentlemen to whom their inventions are submitted for examination. For ourselves we are not given to dictating or even to suggesting what ought or ought not to be done in Patent Office matters, but from long acquaintance with its business and practice we are convinced that it would be well to increase the number of "Rooms," and give each Examiner and First-assistant Examiner a separate class. This plan was begun by Judge Mason, and has been since continued to some extent in order to keep the Office from being overwhelmed with unexamined cases, and we believe it is the only plan by which to avoid the numerical increase of the force. Congress has twice sanctioned this plan by directing the Commissioner to put those who acted as full Examiners upon the same footing as to salary while they so acted. [See Acts of Aug. 18, 1856, sec. 10, and June 25, 1860]. We hope that Congress will continue this authority to the Commissioner, and thus enable him for a while longer to keep up the work with his present economy of force.

LIGHTING PAPER AT A LAMP.

If the end of a piece of ordinary paper be inserted in the blaze of a candle it will take fire instantaneously, but if a similar piece of paper be passed down the chimney into the hotter blaze of a kerosene lamp it will not ignite. If a piece of light wood be thrown upon an anthracite fire in a grate at the back side next the chimney, it will smoulder away without any blaze, but if it be drawn forward to the front edge of the fire it will flash instantly into flame.

These facts would have been unfathomable mysteries to the ancient authors of classic literature who believed that fire was one of the four elements, but they are very simple to the modern school-boy, who knows that combustion is the chemical combination of two substances. As the burning of paper is the act of combining its carbon and hydrogen with oxygen, the presence of oxygen is just as essential to combustion as the presence of the paper.

Oxygen, forming one-fifth of the volume of atmospheric air, and being mingled in it mechanically, is met with in a free state wherever the atmosphere exists. Cold oxygen might lie by the side of cold paper forever without any combination taking place, but if they are heated to about 1000° they immediately enter into combination. In lighting paper, the office of the blaze is to heat the paper to the temperature at which it will combine with oxygen, and if this is done in the atmosphere where the oxygen is always present, the elements enter into that rapid combination which is combustion.

The air in the interior of a lamp chimney has been deprived of its oxygen by burning the oil. If a careful analysis were made of this air it would be found to consist of nitrogen, steam, and carbonic acid; the nitrogen being left from the air after the oxygen is consumed, the steam being formed by the combination of oxygen with the hydrogen of the oil, and the carbonic acid by the combination of oxygen with the carbon of the oil.

The wood on the back side of a grate fire is decomposed by the action of heat, its hydrogen being driven off as a gas, and floating up the chimney, but this hydrogen does not burn because the air that rises through the fire has been deprived of its oxygen in burning the coal. But if the stick be drawn to the front edge of the grate, the hydrogen as it escapes encounters the free oxygen of the atmosphere, and will flash into flame.

SPECIAL NOTICE.

IRA L. CADY, of New York City, has petitioned for the extension of a patent granted to him on April 29, 1851, for an improvement in compound metallic door for vaults, safes, etc.

It is ordered that the said petition be heard at the Patent Office, Washington, on Monday, April 10, 1865, at 12 o'clock, M., and all persons are notified to appear and show cause, if any they have, why said petition ought not to be granted.

A GENERAL movement is said to be on foot among the Western Railroad Managers, in view of the increased cost of fuel in particular, and of construction, repairs, and other expenses in general, to reduce the speed of passenger trains to a maximum of twenty miles per hour.



ISSUED FROM THE UNITED STATES PATENT-OFFICE
FOR THE WEEK ENDING JANUARY 31, 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.

46,061.—Mode of Economizing the Manufacture of Articles of Leather.—William Adamson, Philadelphia, Pa. Ante-dated Dec. 29, 1864:

I claim cutting from raw or untanned hides or skins, or parts of the same pieces, of the size or about the size and form required for useful articles of tanned leather, and tanning the said pieces after they have been thus cut from the raw or untanned hides, as and for the purpose herein set forth

46,062.—Process for Making Looking Glass.—Louis Paul Angenard, New York City:

I claim the chemical proportions and preparation of the solution and its application to plate glass and other kinds of glass.

46,066.—Manufacture of Argand Burners.—Ellis S. Archer, New York City:

I claim the making of an Argand burner, in the manner described, thus dispensing with the tip or perforated ring, as heretofore made.

46,064.—Sewing Machines.—Joseph W. Bartlett, New York City:

First, I claim the combined sliding and rocking movement of the looper, or under needle rod, or shaft, i, when arranged and actuated, substantially as set forth.

Second, I claim the adjustable sleeve or lever, o, when constructed and operated as and for the purposes set forth.

Third, I claim the sliding and rocking looper, or under needle rod or shaft, i, the adjustable sleeve or lever, o, the cam or lever, u, and pin or projection, z, when combined substantially as set forth.

Fourth, I claim the sliding and rocking looper or under needle rod or shaft, i, the cam or lever, u, pin or projection, z, and feed bar, s, when combined substantially as set forth.

Fifth, I claim the presser foot, e, cam, x, (as shown and described in Fig. 7, sheet 2,) and sliding and rocking rod or shaft, i, when combined substantially as set forth.

46,065.—Machine for Surface-sizing, Wadding, Etc.—Samuel Baxendale, of South Malden, Mass.:

I claim, first, The combination of the rotary cylinder, F, having pin points or other rigid projections on its periphery, with the rotary brush, D, or its equivalent, from which the pins or projections of the said cylinder receive the sizing, to sprinkle it upon the bat or web by centrifugal force, substantially as herein specified.

Second, The deflector, I, in combination with the cylinder, F, substantially as and for the purpose herein described.

Third, The reticulated or perforated metallic endless aprons, E E', in combination with a device for sprinkling the sizing upon the bat or web, substantially as and for the purpose herein set forth.

Fourth, The employment, in combination with two perforated or reticulated endless metallic aprons, E E', operating together, as herein described, of a blast pipe, M, or other equivalent device for delivering a blast of air, applied within one of said aprons, substantially as and for the purpose herein set forth.

46,066.—Instrument for Cutting Photographs.—Theodore Bergner, Philadelphia, Pa.:

I claim the described instrument for cutting out photographs, when its punch, A, die, B, and guide plate, C, operated as set forth, and are relatively so arranged as to facilitate accurate adjustment of the picture to be cut out, substantially as specified.

I also claim, in combination with the described instrument, the use of gages, b and o, substantially as and for the purpose specified.

46,067.—Centrifugal Ventilator.—Alpheus P. Blake, Milton, Mass.:

I claim, first, The arrangement of the fans or blowers of the exhaust wheel.

Second, Encasing the fans or blowers at the top and bottom.

Third, The combination and arrangement of the fans, disk and wheel, as shown in section in No. 2, all of which substantially as described and for the purpose set forth.

46,068.—Stave Machines.—Isaac W. Bowers, Ovid Centre, Mich.:

I claim the combination of the saws, H H, and springs, M M, applied to a stave-cutting machine, to operate in the manner substantially as and for the purpose herein set forth.

[This invention consists in combining two circular saws and two springs with a stave-cutting machine. The object of this invention is to saw the ends of the staves with the cutting operation, so that they will be all of the same length, thereby avoiding the necessity of sawing the staves after they are cut, in order to render them of equal length.

46,069.—Apparatus for Evaporating Saccharine Liquids.—Barclay Brown, Byberry, Pa.:

I claim, first, A grate made in sections, which can be moved both in a horizontal and in a vertical direction, substantially as and for the purpose described.

Second, The hook frames, D D' D'', and levers, E E' E'', arranged with sectional grates C C' C'', and handles, F F' F'', or their equivalents, in the manner and for the purpose substantially as set forth.

46,070.—Portable Gravitating Coal Sifter.—Wm. E. Brown, Boston, Mass.:

I claim the combination with a series of inclined sieves or screws of one or more deflectors, composed of inclined surfaces throwing the ashes out of the path of the sifted coal into the ash box, substantially as herein described.

46,071.—Adhesive Fastening for Papers.—George R. Burdon, Waltham, Mass.:

I claim locking or joining together loose sheets or pieces of paper by means of a hinged binding, composed of pieces of leather or cloth, united by means of a pin, or locked into each other, as set forth.

46,072.—Newspaper File.—Wm. Burnet, Providence, R. I.:

I claim the single rod, with a longitudinal groove or recess to receive the back of the folded sheets—the cord or wire shutting into the groove, and attached at one end to the spiral spring contained in the handle, and the other attached to the conical-shaped knot fitting the counter sink in the top of the rod, all made and operating substantially as set forth, or their mechanical equivalents.

46,073.—Pumps.—John H. Burns, Clinton Station, N. J.:

I claim, first, The barrels, A A', arranged at angles as described, in combination with the vertical crank shaft, E, and common ascension pipe, J, constructed and operated as and for the purpose herein shown and described.

Second, The spherical plungers, B, in combination with the barrels, A A', of a pump, and with the crank shaft, E, and operating substantially as and for the purpose set forth.

[This invention relates to an improvement in double-acting pumps, with two barrels placed in an oblique or angular position, and having their plungers connected to a vertical crank shaft, in combination with a common ascension pipe, in such a manner that by imparting to said crank shaft a rotary motion, both plungers will assume a reciprocating motion in opposite directions, and a continuous stream of water be forced through the ascension pipe. The plungers are made spherical to enable them to accommodate themselves to the varying position of the crank.]

46,074.—Construction of Gunboats.—Stephen Decatur Carpenter, Madison, Wis.:

I claim the manner of constructing the portion of gunboats or war vessels exposed to shot, shell or other projectiles, with outward projecting angles for the sides and ends, in combination with the level deck, substantially as herein described and for the purposes set forth in the specification.

46,075.—Painting Pails.—Jonathan Carter, Winchendon, Mass.:

I claim the conical die roll, when constructed in the manner and for the purposes substantially as set forth and described.

46,076.—Hand Stamp for Printing.—D. H. Chamberlain, West Roxbury, Mass.:

I claim bifurcating the outer end of the lever, C, so as to admit of the type block, E, being readily removed and replaced, in the manner substantially as set forth.

46,077.—Valve Cocks.—William Chesley, Cincinnati, Ohio:

I claim so constructing the boss, G, and the hub, H I, as to liberate the valve screw stem for regrinding, by simply screwing back said hub, which thereby becomes a fixed guide for the smooth portion of said stem, substantially as set forth.

46,078.—Machine for Washing Wool.—James A. Clarke, New York City:

I claim the combination of the apparatus described, for conveying the wool, etc., through the reservoir, with the apparatus for washing the same, consisting of the stamps, constructed as described, acting on a roller bed or its equivalent, as and for the purposes herein set forth.

46,079.—Filters.—Chas. Cleminshaw, Troy, N. Y.:

I claim the combination of the packing ring, c, with the close vessel, A, filtering medium, B, pipe, C, screw, b, and perforations, a a, arranged and operating as and for the purposes specified.

[This invention consists in forcing the liquid through the filtering medium by means of a pump or other power, whereby the work is not only done more expeditiously than formerly, but a great economy effected in the saving of the filtering material, as all parts of the latter are rendered available in consequence of the power applied to the latter to force it through.]

46,080.—Valve for Submarine Ordnance.—John F. Cleu, New York City:

First, I claim the plug, B, provided with one or more valves, C C', and a cap, E, for the purpose of protecting said valves and excluding air from an exhausted cannon.

Second, I further claim the check valve, C2, employed substantially as described, to protect the aperture, b, and valves, C C', from the expansive pressure of the gases within the gun.

[The object of this invention is to provide means whereby the air contained in a submarine gun, between the charge and muzzle, may be drawn out and the gun kept in an exhausted condition, in order that the projectile may not meet with atmospheric resistance, and obtain greater range and penetrative effect.]

46,081.—Beverage.—Alexander Cochard, Port Richmond, N. Y.:

I claim the beverage prepared of the ingredients and in the manner specified.

46,082.—Combs.—G. F. J. Colburn, of Newark, N. J.:

First, I claim the combination of a movable metallic back with a comb, substantially as described, so that the comb can be readily taken out and replaced without injury to the said back.

Second, The use of a socket in one end of the metal back of a comb, in combination with a lip projecting from the end of the same, and with a clamp screw or other suitable fastening at the opposite end, substantially as and for the purpose specified.

Third, The combination of the metallic back of a comb, with a handle or case of similar material, and fitting the same together, substantially as and for the purpose described.

Fourth, So constructing a comb that the comb part proper and the back may be readily detached, substantially as described.

[This patent is additional to the one issued to the same party on the 17th inst., which we noticed at the time. We understand that Messrs. Howard, Sanger & Co., Nos. 105 and 107 Chambers street, New York City, are now manufacturing the combs.]

46,083.—Combined Roller and Corn Planter.—Peter Conrad, of Dorchester, Ill.:

I claim the bar, R, provided with the horizontal wheel, S, and arranged substantially as shown, in combination with the roller, B, for the purpose herein set forth.

I further claim, in combination with the bar, R, wheel, S, and roller, B, a corn-planting device, substantially as set forth.

[This invention has for its object the combining of a roller with a corn-planting device, in such a manner that the two devices will operate together much more perfectly than hitherto.]

46,084.—Hot-air Engines.—Moses G. Crane, of Chelsea, Mass.:

I claim, in hot-air engines, the arrangement of the main cylinder, the air pump, the furnace, the air passages and exhaust valve, so that the air pump piston shall work with equal pressure on each side thereof, substantially as set forth.

Also the employment of the valve, o, in the pump piston, in connection with the regulator valve in the passage between the pump and furnace, when arranged to operate substantially as specified.

Also so operating the pump piston in the stroke which supplies the main cylinder that said piston completes its said stroke before the main cylinder piston completes the stroke which is consequent upon said supply.

46,085.—Tub for Washing and other purposes.—John Danner, Canton, Ohio:

I claim, in combination with a washing tub composed of staves of wood, a metallic bottom, constructed and united thereto, in the manner substantially and for the purposes described.

46,086.—Stump Extractors.—Samuel Derr, Lockhaven, Pa.:

I claim the arrangement of the legs, B B B B, under the frame, A, so that they may occupy more or less breadth of space, substantially as and for the purposes herein specified.

I also claim in combination with the above the arrangement of the cross braces, M M M M, and tension rods, P P, so as to adapt them to the variations in the position of the legs, B B B B, substantially as herein set forth.

46,087.—Horseshoes.—William Disbrow, San Francisco, Cal.:

I claim a horseshoe composed of the parts, A A and G, the former being connected by a hinge, B, at their front ends, and provided with the pieces, D D, and heel plates, E E, the latter having oblique plates, F F, which enter notches or grooves made in the sides of the hoof, and the part, G, secured to the parts, A A, by screws, the whole being constructed, combined and arranged, either with or without the leather or other material, K, substantially as and for the purpose herein shown and described.

[This invention relates to a new and improved horseshoe, by which the latter may be secured to the hoof or foot without the aid of nails, and which will admit of being applied to and detached from the hoof or foot with the greatest facility.]

46,088.—Retorts for Distilling Petroleum.—Geo. H. S. Duffus, New Orleans, La.:

I claim in stills for rectifying petroleum and other oils, or producing illuminating or other oils or gases from any substances capable of treatment by heat, making the bottom of the retort with a dome or its equivalent rising therefrom up within its interior, substantially as described.

46,089.—Retorts for Distilling Petroleum.—Geo. H. S. Duffus New Orleans, La.:

First, I claim in stills for rectifying petroleum, or in which oils, coal or other substances are treated by heat, arranging the furnace and the flames or incandescent fuel can be moved near to and further away from the retort, according to the condition of the work, substantially as described.

Second, The burner or furnace, I, constructed substantially as described.

Third, The combination of the pervious cones with the gas pipe, h, and the perforated plates, I and j, or their equivalents, substantially as described.

46,090.—Retorts for Distilling Petroleum.—Geo. H. S Duffus, New Orleans, La.:

I claim, first, In stills for rectifying petroleum and other oils or producing illuminating or other oils or gases from any substances capable of treatment by heat, covering the still with a jacket, inclosing or composed of non-conducting materials, substantially as described.

Second, The use in stills for rectifying petroleum and other oils, or for producing illuminating or other oils or gases from any substances capable of treatment by heat of steam, for the [purpose of cleaning the retort substantially as described.

46,091.—Crib and Cradle.—Henry W. Eastman, Baltimore, Md.:

I claim the combination and arrangement of the hinged sides, N N, rockers, M M, bolts and thumb nuts, L, hooks, K, and metallic frame, O, all constructed and arranged substantially as and for the purpose set forth and described.

46,092.—Obtaining Spirits of Turpentine, Oil, Rosin and other products from Pine Wood.—A. H. Emery, New York City:

I claim, first, Passing a current of ordinary steam over and through the wood into a condenser in the manufacture of spirits of turpentine, rosin, etc., from pine wood.

Second, I claim in the manufacture of turpentine, rosin, etc., directly from pine wood, subjecting the steam, either ordinary or superheated, to a pressure while it is in retort, and passing therefrom into a condenser.

46,093.—Eaves Troughs.—Felix J. Emery, Springfield, Ill.:

I claim the eaves trough above described as a new article of manufacture.

[This invention consists in a new construction of eave troughs, in which cross braces are dispensed with, and the contour of the trough is preserved by means of its own strength and the stiffness of its connecting joints.]

46,094.—Street-sweeping Machine.—Samuel Emleu, Philadelphia, Pa.:

I claim, first, The vibrating brush, having a rising and falling motion, as hereinbefore set forth.

Second, The mode of driving the said brush by means of the pinions and ratchets upon the crank snaft.

Third, Jarring the brush at the extremes of its vibrations, as herein set forth and described.

Fourth, So proportioning the gearing of the machine to the diameter of the wheels and length of the brush that the same surface shall be repeatedly swept, substantially in the manner herein set forth and described.

Fifth, Combining the aprons upon the flanks of the machine with a vibrating brush, having lifting and jarring motions, as described.

Sixth, Attaching the brush to the vibrating beam or arm by means of springs, in the mode and with the effect described.

Seventh, The device for lifting the brush from the street pavement by the hand of the attendant without stopping the motion of the machine when said brush is vibrated and operated substantially in the manner hereinbefore set forth and described.

46,095.—Canteen Plates, Cup and Funnel.—Charles O Farciot, Philadelphia, Pa.:

I claim, first, The combination of the valve, E, with the canteen, G, when constructed in the manner hereinbefore specified and shown in the drawings hereto annexed.

Second, Combining with the canteen, G, the plates, H and H', so as to form cavities for containing provisions between the said plates and canteen body, the funnel, A, and bag or cover, B, in the manner and for the purposes hereinbefore set forth and specified.

46,096.—Neck-tie Holders.—J. Albert Eshleman, Philadelphia, Pa.:

I claim the plate or holder, A, arranged for the reception and removal of a ribbon or tie passing around the central part of the plate, and between it and the spring, and for confinement to the collar, all as set forth.

46,097.—Manufacture of Boxes.—Fred. W. Fliedner, New York City:

I claim the use in the manufacture of boxes of sheets of wood prepared substantially as described, as substitute for the sheets of paste board now used in the manufacture of paper boxes.

46,098.—Coffer Dam.—Arthur Folsom, New York City:

I claim the coffer dam, constructed and operated substantially in the manner described.

46,099.—Apparatus for Cutting Photographs.—L. A. Fowlley, Boston, Mass.:

I claim the apparatus herein described for cutting photographic pictures, passe partout frames etc., arranged and operating substantially as described.

46,100.—Safety Guard for Hammer of Fire-arm.—H. E. Gibbon, Brooklyn, N. Y.:

I claim, first, The combination with the hammer of a gun of a toothed rack and spring detent for holding the hammer locked in certain positions, substantially as above described.

Second, I also claim setting the detent for engagement with the rack, and also throwing it beyond the path of the rack, by means of the same dog, d, substantially as above described.

[The object of this invention is to prevent the accidental discharge of a gun from careless handling, or from unavoidable contact with other objects, and it consists in a device which locks the hammer in every position except that of full cock, and which is alternately set and unset by the cocking and striking of the hammer.]

46,101.—Mounting Hand Mortars.—Wm. F. Goodwin, New York City:

I claim, first, Constructing a mortar with a hollow sleeve projecting from its base instead of trunnions or cheeks, substantially as above described, for the purpose of receiving the elastic cushion or any equivalent spring, and the end of a stake, as above set forth.

Second, I also claim the combination of the slot, E, and pin, D, with the aforesaid mortar, A, sleeve, B, and spring, C, as and for the purposes specified.

46,102.—Dead-center Lift.—Jas. J. Gorman, Cincinnati, Ohio:

I claim, first, The reciprocating rod, G, with tappets, b b, working beam, F, and pitman, E, in combination with the pitman, C, and crank, D, constructed and operating substantially as and for the purpose set forth.

Second, Making the rod, G, reversible, and combining it with working beams, F F', pitman, E E', and crank, D, substantially as and for the purpose described.

Third, The expansion bearers, d d, applied in combination with the spring, J, pitman, E, and crank, D, substantially in the manner and for the purpose specified.

[An engraving and description of this invention is published in the SCIENTIFIC AMERICAN, page 31, vol. XII.]

46,103.—Apparatus for Rendering Lard, Tallow, Etc.—C. E. Gray, New York City:

I claim, first, Making a close water jacket in combination with the tank and a part of it, and arranging said water jacket so made a part

of said tank in direct communication with the furnace, so that the water jacket shall intervene between the fire and the tank and act as a means of conducting and distributing the heat from the fire to and around the fat.

Second, Using the steam generated in a close tank from the constitutional water in the fat, for the purpose of aiding and controlling the escape of the noxious gases and vapors, either to a super heater for consumption in the furnace or to a deodorizer for the purpose of deodorizing them, or to a condenser for the purpose of condensing them, in the manner substantially as described for the purpose specified.

46,104.—Machinery for Oiling Wool in Carding Machines.—George Shaw Harwood, Boston, Mass.:

I claim, first, The means and manner herein described of oiling wool whilst being fed to carding or other wool preparing machine by direct application of the oil or lubricating mixture on to either or both feed rollers substantially as set forth.

Second, In combination with carding engines or other wool preparing machinery of otherwise ordinary or suitable construction, I claim a covered oil tank or cistern for supplying either or both feed rollers of said machinery with oil, whether the same is effected directly by dripping the oil upon the roll or through the intermediary of a brush, roller, or band, or the mechanical equivalent thereof.

Third, In an oiling apparatus constructed for use as an attachment to carding or other wool preparing machine and in which the oil is distributed to either or both of its feed rolls, I claim the combination of an oil tank with a dipper arranged for operation substantially as set forth so that the oil or lubricating mixture shall be thoroughly mixed and conveyed to the feed rolls directly or through the intermediary of a brush, cylinder, or apron, substantially as described.

Fourth, I claim the employment of a roller or rollers made of any of the vulcanizable gums in combination with a dipper and pressure roller.

Fifth, In combination with a dipper and pressure roller, I claim two or more rollers revolving both upon their own axes and upon an axis common to them, substantially as herein described.

Sixth, I claim the apparatus herein described for oiling wool on the card, the same consisting of a tank extending transversely the whole width of the feed rolls of a rotary dipper and a revolving distributor when arranged to operate as described so as to agitate and convey the oil from the tank directly to the feed roller or rollers.

46,105.—Orchard Ladder.—Casson Hayes, Madison, Wis.:

I claim, first, The back brace, B, constructed with a single bearing point, substantially as shown.

Second, I claim the adjustible side braces, C, C, in combination with the brace, B, as and for the purpose set forth.

Third, I claim securing the side braces, C, C, by means of the the hooks, D, and buttons, d, as shown and described.

46,106.—Scroll Sawing Machine.—Antoine August Hoffman, New York City.

I claim the application to scroll saw frames of the adjustable centres of motion constructed with pins or points and conical sockets and retaining guards combined substantially in the manner described.

And I also claim the application of the device by which the saw may be turned, consisting of a cylindrical pin with a spherical head, combined with a socket made in halves and held by a jam nut and set screw, substantially as described, for the purpose specified.

46,107.—Hot Air Furnace.—Birdsill Holly, Lockport, N. Y.:

I claim the combination and arrangement of the radiating cylinder, A, or equivalent, fire pot, B, sliding plate, G, flue opening, f, and bar, h, substantially as and for the purposes herein specified.

46,108.—Threshing Machines.—Orsamus Holmes, New Lenox, Ill.:

I claim the giving of a longitudinal shake and tossing motion to the straw carrier, D, by a pitman, b, and crank, a, also the connecting of the grain screen, G, to the carrier, D, through the medium of the levers, E, E, arranged as shown, in combination with the straw shoe, F, attached to the rear of the screen, G, and provided with wires or rods e, e', substantially as and for the purpose herein set forth.

[This invention relates to a new and improved sliding or agitating device to be applied to grain threshing machines for the purpose of separating the loose grain from the straw, and enabling the grain and straw to be discharged separately from the machine.]

46,109.—Safeguard for Protecting Pottery Ware.—Benj. Jackson, Trenton, N. J.:

I claim a safeguard or "saggar" to receive articles of pottery ware while being burned or baked, composed of a series of rings or frames of fire clay so constructed or arranged that they may be fitted one over the other and receive pins to support the articles fitted within substantially as described.

46,110.—Windlass.—Peter H. Jackson, New York City, and Samuel Eddy, Brooklyn, N. Y.:

We claim [a chain wheel or windlass, formed with radial ribs that are movable, substantially as specified.

We also claim forming the annular space around a chain wheel with offsets, C, C, to better adapt the same to different sizes of chain as specified.

46,111.—Steam Engine Governor.—Oliver A. Kelly and Estus Lamb, Slatersville, R. I.:

We claim, first, The employment or use of a screw rod, b, screwing in the end of an arm, c, which extends from the rock shaft or valve spindle, d, and applied in combination with the governor and with suitable gear, substantially as and for the purpose set forth.

Second, The escapement wheel, k, and pawls, m, m', applied in combination with suitable bevel gear, e, f, screw rod, b, and with the governor and valve gear, substantially as and for the purpose described.

Third, The shoe, r, and cam slot, b', arranged in combination with each other and with the pawls, m, m', escapement wheel, k, screw rod, b, and with the governor and valve gear, substantially as and for the purpose specified.

Fourth, Making the shoe, r, in two parts which are hinged together, substantially as and for the purpose set forth.

Fifth, The tail, d*, applied to the hinged shoe, r, and operating in combination with the bar, c*, secured to the rock shaft, d, substantially as and for the purpose described.

[An engraving and description of this invention was published in the SCIENTIFIC AMERICAN, p. 344, Vol. XI.

46,112.—Gate.—Robert Kelly, Tuscola, Ill.:

I claim a gate constructed of uprights and slats and provided with an oblique or diagonal brace, one or more, a perforated slide and a pin or pins, all arranged substantially as and for the purpose herein set forth.

[This invention relates to a new and useful improvement in the construction of gates, those of large size, for vehicles to pass through. Gates of this size are quite liable to sag, owing to their length, and they soon drag upon the ground, so that the opening and closing of them is attended with considerable difficulty. This invention obviates this difficulty.

46,113.—Sawing and Boring Machine.—B. Klahr, Bernville, Pa.:

I claim, first, The combination of the parts by which the post is secured in position and moved to the tool, consisting of the carriage, C, the yoke, b, and clamping screw, a, with the stapled lever, c, acting in connection with the pins, d, d*, and stop, e, substantially as described.

Second, The movable bracket, J, and forked rest, i, in combination with the pin, j, carriage, C, and saw, I, constructed and operating substantially as and for the purpose set forth.

Third, The oscillating frame, r, in combination with the saw, I, carriage, C, and frame, A, constructed and operating substantially as and for the purpose described.

[This invention consists, first, in the arrangement of an open carriage provided with gage pins and applied in combination with a suitable hand lever, stop, and bore spindle, in such a manner that the holes in the post can be properly distanced, and by running the borer up three times at suitable points the desired mortise is produced; the post is held in position during the operation of boring by a yoke fastened in the proper position on the table or carriage and the holes are bored from below, so that the post can be readily centered.]

46,114.—Lantern Frames.—Robt. S. Laird, Sandwich, Ill.:

I claim the wire guards, A, attached at their lower ends to semicircular bars, E, E, which are connected to the base, B, of the lantern by hinges or joints, a, and attached at their upper ends to semicircular bars, F, F, which are secured to the top, C, by catches, G, G, substantially as and for the purpose specified.

46,115.—Machine for Making Lace Paper.—Charles Lang, Worcester, Mass.:

I claim removing the elevated parts of embossed paper by means of an apparatus, the principal parts of which consist of two rollers, substantially in the manner and for the purpose described.

46,116.—Cultivator.—Christopher Lidreu, Aurora, Ill.:

I claim the rising and falling bar, E, operated by the levers L, L', and having the plow standards, I, I, permanently attached to it as shown; in combination with the adjustable plow standards, F, F, attached to said bar as described, and operated by the crank shafts, k, all arranged substantially as and for the purpose set forth.

46,117.—Tubular Condensers.—William A. Lighthall, New York City:

I claim, first, The combination of the exhausting fans, J', J'', (or their equivalent) with the tubes, C, and division plates, a, a', a'', a''', a'''', as and for the purpose set forth.

Second, The combination of the exhausting fans, J', J'', (or their equivalent) with the tube, C, and reservoir, M, as and for the purpose set forth.

46,118.—Tire Shrinking Machine.—John A. Lloyd, St Paul, Minn.:

I claim, first, Constructing the lugs, B, B, with horizontal and vertical key seats, so that the article to be secured may be pinched either upon its horizontal or verticle surfaces at pleasure.

Second, In combination with the bed plate, A, of a machine for shortening tires; the lever, D, lugs, B, B, and keys, C, C, substantially as described and for the purpose set forth.

46,119.—Spring Bed Bottom.—George E. Lord, Utica, N. Y.:

I claim the combination and arrangement of the spring, C, with the slat, B, the disk headed pin, D, the cap, E, substantially as and for the purpose set forth.

46,120.—Doffing Apparatus for Carding Engines.—Rushton Lord and Levi Hutton, Rittenhouse, Pa.:

I claim the carded cylinder, B, carded rollers, C, and plain stripping or clearing roller, D, when combined with a carding engine and arranged and operating as and for the purpose herein set forth.

46,121.—Folding Chair or Table.—Ferdinand Ludke, New York City.:

I claim first, The vertically sliding staff, A, with hub, B, and radiating arms, C, in combination with a sleeve, F, braces, E, hinged legs, G, and toggle arms, H, all constructed and operating substantially as and for the purpose set forth.

Second, The combination of the radiating arms, C, and braces, E, with a piece, D, of flexible material, and with legs, G, substantially as and for the purpose described.

Third, The toggle arms, H, in combination with the folding legs, G, and central staff, A, applied and operating substantially as and for the purpose specified.

46,122.—Air Pump.—Azel S. Lyman, New York City.:

I claim, first, An oscillating air or vacuum pump whose valve is operated by a positive movement derived from its vibrating motions, and independent of the piston, substantially as above described.

Second, I also claim constructing and operating the valve and its stem of a vacuum pump, substantially as above described.

Third, I also claim the combination of the inclined plane, J, with the valve and valve stem of an oscillating vacuum pump, substantially as and for the purpose above described.

Fourth, I also claim packing the joint around the valve stem by means of the elastic ring, r, and the packing ring, h, substantially as above described.

Fifth, I also claim packing the joint on the hollow journal of the pump where it unites with the air tube by means of a packing ring, substantially as above described.

45,123.—Drilling Machine.—Warren Lyon, New York City:

I claim, first, The arrangement, as herein shown and described, of the levers, I L, drill arbor, D, with weight, F, attached, the counter poise, M, on lever, L, and the rod, N, for the purpose specified.

Second, The projection, u, and sheath, p, p, on the face or upper side of the bed plate, P, in combination with the slide, R', screw, S, and the adjustable arm, Q, to which the bed plate is attached, all arranged substantially as and for the purpose set forth.

Third, The bracket, C, with the bearings, a, a, attached, when used in combination with the drill arbor, D, and its concomitant ports, as herein shown and described.

[This invention relates to an improvement on a drilling machine, for which Letters Patent were granted to this inventor bearing date September 20th, 1853.]

46,124.—Testing Oil Wells.—Joseph C. Lyon, Auburn' N. Y.:

I claim the combination and arrangement of two flexible air chambers with the air and discharge pipes, so that the air chambers can be placed at any point within the walls of oil wells, and there be inflated, whereby to cut off above the upper, and below the chamber water-gas and other substances, and thereby allow the oil to pass from a fissure between the two chambers and out of the discharge pipes, substantially as herein set forth.

46,125.—Breech-loading Fire-arm.—Isaac M. Millbank, Greenfield Hill, Conn.:

I claim as a new breech-loading fire-arm, combining the following elements, namely:—

The wedge, C, rotating on a hinged arm transversly to the axis of the barrel and provided, as well as the faces on which it impinges, with cleaning grooves, e, the front face of the breech piece having an annular bead projecting forward into a corresponding groove in the rear of the barrel, so that by the withdrawal of the wedge the breech piece may be freed to move to the rear, sufficiently to enable the bead to clear the sides of the groove, as the hinged breech piece is rotated out of its chamber and on being returned charged, may be driven home with the bead pressing upon the elastic packing of the groove, the whole arranged thus described, working upon or contained within a frame, A, which secures the barrel to the abutment.

[This invention consists, first, in a novel mode of applying a wedge in combination with breech piece which opens and closes with a swinging movement transverse to the bore of the barrel, for the purpose of forcing forward the said breech piece toward the barrel to make it form a gas tight joint therewith after it has been closed. It also consists in a novel mode of applying packages of india-rubber or other elastic material in combination with the barrel and movable breech piece of a breech-loading fire-arm for the purpose of making a gas tight joint, when the breech piece is closed.

46,126.—Car Coupling and Buffer.—Ezra Miller, Janesville, Wis.:

I claim, first, So constructing hooked head car couplings that they are adapted to receive links and other forms of couplers and form connections therewith substantially as described.

Second, A hooked head car coupling which is compored of wood and metal constructed substantially as described.

Third, Bending the heads or forward portions of the shanks of coupling hooks in such manner as to give them an even bearing on their stirrups and thus prevent them from tilting laterally in consequence of wear, substantially as described.

Fourth, Locating an elastic buffer in the end of the buffer beam, A, of a platform which is elevated so as to be brought in a horizontal plane with the bed of the car body, substantially as described.

Fifth, Constructing the buffer head, D', with a square shank, D, having a rounded extension, D'', on its ends substantially as described.

Sixth, Preventing lateral thrust of cars in motion by means of interlocking buffer heads constructed and operating substantially as described.

46,127.—Casting Grate Bar for Furnace.—Joseph A. Miller, New York City:

I claim casting two bars simultaneously on the same core substantially in the manner and for the purposes set forth.

46,128.—Canal Scraper.—Thomas Miller, Columbus, Ohio:

I claim the combination and arrangement of the tongue with projecting foot board and parallels, whereby the movable principle is attained for the scraper subject to the control of the operator substantially as set forth and for the purposes specified.

46,129.—Shingle Machine.—Enoch R. Morrison, New York City:

I claim forming the table, C, of a spring plate in such a manner as to furnish an elastic surface its whole length the same being provided with the projections, c c, and operating in combination with the riving knife, b, substantially in the manner and for the purpose herein set forth.

I also claim the pressure plate, M, made elastic by the spring, o, in combination with the way, N, and tooth bar, E, in such a manner that said plate will rise over the bar, but produce a pressure on the shingles in the rear substantially as specified.

I also claim the projections, k', on the under side of the pressure plate, M, which force the riven shingle to the bed plate if too short to be borne upon by the extreme end of the pressure plate, M, the whole arranged as herein set forth.

I claim also the arrangement of the gage slide, P, lever, v, and cam bar, Q, in combination with the tooth bar, E, projection, R, and cam, O, to retain and release the said tooth bar in the manner substantially as herein specified.

I also claim the arrangement of the bar, T, provided with the cams, c' c', and block, U, in combination with the tooth bar, F, and the cams, V V, for retaining and releasing the said tooth bar, substantially as herein set forth.

I also claim the combination and arrangement of the jointers, Y, arms, h' h', guides, z, and spring or springs, g', in such a manner that said jointers act centrally on the shingles substantially as herein set forth.

46,130.—Cotton Seed Planter.—Isaac Myers and Marshall D. Wellman, Pittsburgh, Pa. Ante-dated Jan. 19, 1865.

We claim, first, The use of a feeding rod having a finger or fingers, which vibrate up and down through a suitable orifice in the bottom of the seed box so as to feed a few seeds only at a time and that at regular intervals substantially as described.

Second, I also claim in combination with the feed rod and fingers wires so placed in that part of the rod which passes through the cotton in the feed box for the purpose of loosening the mass of cotton seeds and separating them from each other substantially as described.

Third, Also the use of the sliding frame with or without the inclined planes and operated substantially as described for the purpose of supplying the cotton seed into the hopper box.

Fourth, Also the use of the curved projections, r r, on either side of the hopper box, to prevent the cotton being fed too fast into the hopper box, and clogging therein, substantially as described.

46,131.—Rammer for Revolving Fire-arms.—Frederick D. Newbury, Hudson City, N. J.:

I claim the method of attaching the ramrod to the frame of the piece by the use of revolving standard, S, in order to permit the employment of the same in combination with a cylinder constructed arranged and operated substantially as set forth in this specification.

46,132.—Row Lock.—Joseph W. Norcross, Middletown, Conn.:

I claim the inclined planes in combination with the row lock and pin on which the same swivels, whether the same be secured by the plate or gunwale or the row lock, substantially as and for the purpose herein set forth.

Also the spring catch applied in combination with the row lock and with the pin on which it swivels substantially as herein described for the purpose of holding the row lock in and prevent its coming out spontaneously.

[This invention consists in the use of inclined planes in combination with the row lock and pin on which the same swivels, whether the same be secured to the plate or gunwale or to the row lock, in such a manner that by the action of each inclined plane combined with that of the inherent gravity of the row lock said row lock is turned to a position parallel with the keel; the invention consists further in the operation of a spring catch in combination with the row lock and with the pin on which it swivels in such a manner that the row lock is easily held in its place and prevented from coming out spontaneously.]

46,133.—Sewing Machine Stitch.—Charles Parham, Philadelphia, Pa.:

I claim a machine made stitch formed by first making a loop in one thread, and passing a second loop of the same thread through the first loop, and then passing a second thread through the second loop, and drawing up the slack of the threads and loops tightly in the cloth or other material as it is fed along to receive the stitches as set forth.

46,134.—Process for Manufacturing Underground Pipes. A. H. Perkins, Chicago, Ill. Ante-dated Jan. 6, 1865:

I claim manufacturing pipe by casting prepared pitch or other bituminous substances or compounds between two concentric tubes of heavy fibrous paper, or felt, or its equivalent substantially as and for the purposes herein set forth.

46,135.—Riding or Warping Bit.—Charles Perley, New York City:

I claim the pair of grooved riding bits, formed and applied as and for the purposes spec fied.

46,136.—Fastening Pockets to Billiard Tables.—Louis Petersen, Baltimore, Md.:

I claim the peculiar construction of the metallic frame, carrying the pocket, as described within; and the manner of fastening these frames to the bands of billiard tables by means of screws passing the wood work of said bands and screwed into metalbc nuts, sunk into them, substantially as specified herein before.

46,137.—Gang Plows.—John C. Pfiel, Arenzville, Ill.:

I claim the arrangement of parts by which the relative positions of the plow beam and the draught pole are maintained after the front of the former has been depressed by the foot of the driver, and consisting of the tension chain, K, and lever, G, with its retaining rack, J, the points of attachment being the draught pole, B, and the frame, A, the whole constructed and operated as described and represented.

[This invention relates to a new and improved gang plow, and it consists in constructing the same in such a manner that the plows may, when desired, be readily raised out of the ground by the driver in his seat and the depth of the penetration of the plows into the earth regulated as may be desired.]

46,138.—Lamp Burner.—Anson H. Platt, Yellow Springs, Ohio:

I claim the laterally movable wick regulator, H, operating substantially as and for the purposes herein specified, whether employed for regulating one or two wicks.

I also claim the horizontal sliding elastic bolt, D, for fastening the chimney, substantially as herein specified.

46,139.—Hay Loader.—Wm. Platt and A. G. Burnham, Greenfield, Pa.:

We claim in combination with the elevator, C, the arrangement of the rod, o, and the rocking frame, n n', pivoted on the bar, i, and connected to the rakes, D, by which the latter are raised as may be required, substantially as described and represented.

[This invention relates to a new and improved device to be attached to a cart or wagon for the purpose of raking up the hay and elevating and discharging the same into the cart or wagon as the latter is drawn along in the field and over the hay.]

46,140.—Adjustable Gun Scrapers.—E. L. Pratt, Boston, Mass.:

I claim so applying each scraper blade, c, that it swivels or turns upon or with respect to its spring or wire, b, for the purpose substantially as set forth.

I also claim making each scraper, c, removable for repair, substitution or adjustment, substantially as set forth.

46,141.—Coal Oil Stove.—Charles H. Reichmann, New York City:

I claim coal oil stove composed of one or more lamps provided with draught chimneys and arranged in connection with a drum, substantially as herein described.

Second, In combination with a coal oil stove constructed and arranged as above set forth, I claim the slide or door, h, and glass, f, applied to the lower part of the draught chimney in the manner and for the purposes specified.

46,142.—Safety Valve Regulator.—Peter Riordan, Washington, D. C.:

I claim, first, In combination with a cylinder formed in two parts, A A', of different diameters, I claim the piston heads, B B', when so arranged that the effective area of the head, B, on that side next the steam port, a, exceeds the effective area of the head, B', on the side next the port, a', by as much as the area of the safety valve divided by the number of times by which the length of the long arm of the safety valve lever exceeds that of short arm.

Second, I claim the combination of the valve, F, spring, E, and adjustable nut or collar, G, with the hollow graduated shaft, D, and apertures, d, the whole being arranged and employed substantially as and for the purpose set forth.

46,143.—Process for the Manufacture of Fuller's Soap.—J. F. Rich, Chatham Run, Pa.:

I claim a soap made by treating the liquor in which wool and card strippings or other greasy waste have been scoured with salt alkalies of other saponifiers substantially in the manner herein set forth.

[The nature of this invention consists in a soap made of the liquor in which wool and card strippings or card strippings mixed with other greasy waste have been scoured, such liquor being treated with potash ley, soda ash or other saponifiers and if necessary mixed with an additional quantity of fatty matter if not sufficient fat should be obtained from the scouring process.]

46,144.—Press and Bulk Heads.—Samuel J. Seely, New York City:

I claim, first, Forming water-tight walls partly subaqueous for piers or similar structures of miter-locked sections to utilize the area they enclose substantially in the manner described.

Second, Forming sections for the construction of piers, substantially as described, so that one will firmly interlock with another and exclude the passage of water between them as set forth.

Third, The combination in piers or similar structures of sections that will permit the entrance of light to the area they enclose with suitable fenders to protect them arranged substantially in the manner and for the purpose set forth.

46,145.—Car Wheel.—Samuel J. Seely, New York City:

I claim, first, The combination of the flanged hub with the flanged rim by means of the corrugated face plates, substantially in the manner described for the purposes set forth.

Second, The wooden disk arranged between the rim, the hub and the face plates, substantially as and for the purposes described.

46,146.—Construction of Docks, &c.—Samuel J. Seely, New York City:

I claim, first, The construction of a dock, lock, or other subaqueous structure exposed to the contact of vessels, having metallic tubular supports united together with beams or girders, or trusses of iron, or wood and iron combined, in combination with a fender of wood, or iron, or both, combined with an elastic substance or spring interposed between the dock and fender to prevent injury to the structure from shock or pressure applied to the fender, constructed and operated substantially in the manner above described.

Second, I also claim the combination of a tank vessel or wall of iron, or iron and cement combined, having tubular supports with a fender and forming a dock, lock, wall, or other subaqueous structure exposed to the contact of vessels, so constructed and operating as to ease off all sudden shocks, and to be braced within the structure, substantially as above described.

46,147.—Rudder with Corrugated Surfaces.—Samuel J. Seely, New York City:

I claim corrugating the sides of the blade of rudders, substantially in the manner and for the purpose set forth.

46,148.—Coal Scuttle.—S. B. Sexton, Baltimore, Md.:

I claim, first, Providing a coal scuttle with a hinged plate which is so arranged within the scuttle as to serve as a screen, for sifting coal dust and ashes, or as a shield for preventing lumps of coal from escaping over the sides of the scuttle during the act of replenishing the fire.

Second, Constructing the hinged plate, A, with flanged sides, substantially as described.

46,149.—Machine for Cutting Staves.—H. M. Shaw, Fremont, Ohio:

I claim the slotted arms, a, of the fly wheels, c c, to receive the pins, E E, of the cranks, F F, the shafts, G G, of which are placed out of line with the fly wheel shaft, B, and all arranged in connection with the pitman, H H, to operate the knife frame, I, substantially as and for the purpose herein set forth.

[This invention relates to a new and improved machine for cutting staves for barrels, casks, etc., from bolts of steamed wood, and it consists in a novel construction and arrangement of certain parts whereby the work may be done in a neat and perfect manner and with but a moderate expenditure of power.]

46,150.—Bread and Meat Slicer.—Hiram M. Shaw and Charles B. Stillwell, Fremont, Ohio:

We claim, first, the knife, H, attached to a sash or gate, B, having a rising and falling movement communicated to it by cranks and connecting rods or their equivalents, and the knife having an automatic reciprocating movement communicated to it from the sash or gate through the medium of the lever, I, and rod, J, from the crank or drawing shaft, substantially as and for the purpose set forth.

Second, The adjustable gage, F, attached to the sash or gate, B, substantially as shown, when used in combination with the knife, H, and all arranged to operate substantially as and for the purpose specified.

Third, The adjustable bottom, G, in combination with the gage, F, and knife, H, all arranged to operate as and for the purpose set forth.

[This invention relates to a new and improved implement or device for cutting or slicing bread, dried beef, vegetables and other articles or substances, and it consists in the employment or use of a rising and falling gate or sash with a gage and knife attached, the latter having, besides the rising and falling movement given it by the gate, a reciprocating movement, the gage being adjustable and all arranged in relation with a feed-box and in such a manner that, by the turning of a shaft continually in one direction, the article or substance within the feed-box will be cut or sliced expeditiously and with but moderate expenditure of power.]

46,151.—Clothes Dryer.—Elbridge Sims, Antwerp, N. Y.:

I claim a clothes dryer composed of a series of frames, A B C, connected together by pivots or joints, suspended on a wall or vertical support and provided with bars, D, all arranged substantially as described.

[This invention relates to a new and improved device for holding clothes while drying, and it consists in the employment or use of a series of frames connected by pivots, suspended from a wall, and provided with arms whereby a very convenient and portable device is obtained for the purpose specified.]

46,152.—Turning Lathe.—Dwight Slate, Hartford, Conn.:

I claim the employment in combination with the guide bar, g, and with the adjusting screw, d, or its equivalent, of the tool carriage, of the connecting bar, f, arranged substantially as herein before set forth.

I also claim the employment in combination with the guide bar and connecting bar aforesaid of the slide, I, jointed to the connecting bar and locked to the guide bar substantially as and for the purpose herein before specified.

46,153.—Meat Chopping Machine.—Alfred F. Spalding and Salmon M. Scott, Winchendon, Mass.:

We claim the improved machine constructed substantially in manner and so as to operate as described, that is to say with the safety spring or springs, r, arranged with each of the knife carriers and its operative mechanism as described, the knife or knives being arranged to work in a rotary tub in manner as explained.

46,154.—Tool for Drawing Spikes.—George Stone, Boston, Mass.:

I claim the handle or lever, A, formed or provided with the jaw, B, in connection with the rocker-shaped fulcra, c c, provided with the jaw, D, and having the handle or lever secured between them by a pivot bolt, substantially as and for the purpose herein set forth.

[This invention relates to a new and improved implement or device for drawing spikes, large nails, pins, etc., and it consists in the employment or use of a handle or lever, the lever end of which is provided or formed with a jaw of curved form, the handle or lever at its junction with the jaw being secured by a pivot bolt between two rocker-shaped fulcra which are connected at one end and so constructed as to form a jaw; all being arranged in such a manner as to admit of spikes, nails, etc., being drawn with the greatest facility.]

46,155.—Corn Sheller.—Peter Sweeney, New York City:

I claim, first, The revolving open cylinder, D, with a helical flange, b, and pegs, d, in combination with a series of hoppers, F, arranged around said cylinder and operating substantially in the manner and for the purpose herein shown and described.

Second, The perforations, g, in the plates, c' d', composing the hoppers, arranged substantially as and for the purpose described.

46,156.—Process for making Concentrated Fluid Extracts.—N. S. Thomas, Painted Post, N. Y.:

I claim the within-described process of producing concentrated fluid extracts by bringing the crude drug gradually in contact with the desired measure of liquid to be represented by the extract, and exposing it after each application of liquid to a heavy pressure, substantially as set forth, whereby extracts of uniform strength can be made and both heat and evaporation are avoided.

[This invention relates to an improved process of producing that class of extracts which are made so that a certain amount of liquid shall represent pound by pound medically the same quantity of crude drug, and which are generally obtained by extracting with a large excess of liquid and evaporating down to the desired density.]

46,157.—Apparatus for Fluting Trimmings.—Sineous Totten, Brooklyn, N. Y.:

I claim a fluting apparatus consisting of a series of rods, C D, and one or more frames, A, arranged and operated substantially as shown and described.

[The object of this invention is to obtain a simple and economical apparatus by which trimmings for ladies' wearing apparel, such as dresses, cloaks, etc., may be fluted expeditiously and in a perfect and durable manner.]

46,158.—Artificial Arms and Hands.—Thomas Uren, New York City:

I claim the combination of the expansion and contraction cords with each other and with the artificial upper and fore-arm hinged at the elbow joint, and with the straps, or equivalent thereof, for securing the artificial arm to the body, and with which the said expansion and contraction cords are attached, substantially as described, whereby the fore-arm can be lifted and bent, or thrown out and straightened at the will of the person wearing it, by a simple motion forward or backward of the stump of the amputated arm.

I also claim the combination of the hinged fore-arm with the balance cord and spring, substantially as described, whereby the weight of the hinged fore-arm is balanced by the said spring, and when desired can be made to hang naturally, as described, whilst at the same time the fore-arm, being so balanced, will greatly facilitate the motions to be imparted to the artificial arm.

I also claim the combination of the expansion and contraction cords with the balance cord and spring with the hinged fore-arm, substantially as and for the purpose specified.

I also claim the combination of the hinged hand, the turning wrist piece, the fore-arm, and the hinged connecting rod, substantially as and for the purpose specified.

I also claim the hinged hand, the turning wrist piece, the fore-arm and the hinged rod by which they are connected, substantially as specified, in combination with the means of connecting the said hinged rod with the fore arm by a turning joint and spring or equivalent adjustable connection, substantially as specified, so as to admit of turning the wrist, as set forth.

I also claim the hinged fingers with the contraction cords and the spring with which the said cords are connected, substantially as described, whereby the fingers and, as an equivalent, the thumb can be contracted, as set forth; and this I claim whether the said spring be located within the hand or on the arm, as set forth.

I also claim the hinged fingers, the contracting cords and the spring connected therewith, in combination with the expansion finger cords, substantially as described, whereby the fingers can be opened or closed at the will of the person wearing the artificial hand, as set forth.

46,159.—Artificial Arms and Hands.—Thomas Uren, New York City:

I claim combining the fore-arm which is hinged at the elbow to the upper artificial arm, with a cord attached to the back of the fore-arm and below the elbow joint, and which passes over a guide roller mounted in the fore-arm and near the lower part thereof, and thence through the back of the upper arm and attached to the strapping at or near the back, substantially as described, thus enabling me to produce an artificial arm for an upper amputation, which, by a single connection, will enable the person wearing it to move the arm at will, as described.

I also claim the spring arm or lever which projects to the outside of the fore-arm, so as to be operated by bearing against any resisting object, substantially as described, in combination with the jointed fingers and the expansion and contraction cords, substantially as and for the purpose specified.

46,160.—Blueing Paste.—Robert G. Vassar, Poughkeepsie, N. Y.:

I claim the peculiar combination of the above ingredients forming a more economical and perfect blueing than any now in use.

46,161.—Chest-expanding Suspenders.—G. W. Walker, Lowell, Mass.:

I claim the openings, V V, in the shoulder pieces, D D, of chest-expanding suspenders when made and applied substantially as herein described and shown and for the purpose set forth.

46,162.—Making Corrugated Funnel Spout.—Jonathan Walton, Brooklyn, N. Y.:

I claim the process of making corrugated funnel spouts by first crimping the flat plate between corrugated plates, E E, and afterward turning it around a longitudinally corrugated mandrel and pressing it thereon between corrugated dies, all as hereinbefore described.

46,163.—Making Bonnet Binding.—Jefferd L. Weaver, Orange, Mass.:

I claim the above described continuous bonnet binding, the same being produced by arranging the warps or strands alongside of and so as to lap by and on one another, as explained, holding each strand in place by means of strings and weights until woven into place, and finally connecting the warps by a filling or weft woven into them, substantially as specified.

46,164.—Gang Plow.—Henry Webster, Beetown, Wis.:

I claim, first, The employment or use in a mounted gang plow of an oblique adjustable axle so arranged as to admit of the ready adjustment of the wheels for giving the plows more or less land, substantially as set forth.

Second, The frame, H, applied to or connected with the draught pole, A, by means of a joint in connection with the racks and toothed segments, when applied to a gang plow, substantially as set forth.

[This plow is for turning two or more furrows simultaneously, and it consists in a means for readily guiding the plows so as to give the same more or less land, and also in a means for raising and lowering the plows to regulate the depth of their penetration in the earth and to elevate them above the surface of the same when not required for use.]

46,165.—Steam Engine.—Thomas Welham, Washington, D. C.:

I claim placing one, two or more right and left-hand screws in the cylinders, as herein described, on the inside or outside of a steam or gas boiler, so as to receive and discharge the steam or gas, substantially as and for the purposes set forth.

46,166.—Universal Shafting.—Thomas Welham, Washington, D. C.:

I claim a revolving shaft made of flexible material so as to operate in various positions or any curve, in the manner and for the purposes set forth.

46,167.—Hydraulic Brush.—Thomas Welham, Washington, D. C.:

I claim the arrangement and combination of the revolving brush and the revolving water wheel attached to the point of a water spout or hose, as herein described and for the purposes set forth.

46,168.—Folding Bucket.—H. W. Wilcox, Columbus, Pa.:

I claim a folding pail or bucket composed of a rim constructed of a number of parts, B, connected together by joints and having a flexible water-proof substance attached to them to form the body of the pail or bucket, and the rim having a jointed handle, C, attached, all constructed and arranged substantially as set forth.

[The object of this invention is to obtain a pail or bucket which, when not in use, may be compactly folded so as not to monopolize much space and still be strong and durable, and capable of being readily expanded when required for use.]

46,169.—Reaping Machine.—David Wolf, Lebanon, Pa.:

I claim a platform for reapers, composed of two or more parts connected by a joint or joints, and arranged to operate in the manner substantially as herein shown and described.

[This invention consists in constructing the platform with a hinge or joint, in such a manner that it may be moved or adjusted, either by an attendant or an automatic arrangement, so as to discharge the cut grain from it.]

46,170.—Harvesters.—Alonzo Wood, Henrietta, N. Y.:

I claim adjusting the reels of harvesters so as to adapt them to the inequalities of hight of the straw in a field of grain by means of the arms, G G, hand wheel, N, chains or cords, M M, or equivalent, and pawl lever, P, the whole so arranged that the driver can operate the same without stopping the machine, substantially as herein set forth.

46,171.—Steam Boilers.—Enos D. Wood, Utica, N. Y.:

I claim the domes, A C, or their equivalents, constructed and arranged in combination, substantially as described, for the uses and purposes mentioned.

46,172.—Shirts.—Abraham Wormser, New York City:

First, I claim combining with a shirt made without a bosom a removable bosom attached around the edges to such shirt as specified.

Second, I claim forming the neckband or band upon said bosom to bottom, or be attached to the shirt at the back of the neck, as set forth.

46,173.—Low-water Detectors.—Joseph Yates, Mott Haven, N. Y.:

I claim, First, The combination and arrangement of the float, D, the chest, C, the rod, E, lever, F, and the rods, H H, substantially as and for the purpose set forth.

Second, I claim the elastic diaphragm or diaphragms, I, in connection with the levers, F, rods, H H, and the lever, G, substantially as and for the purpose specified.

46,174.—Shoe Lasts.—Samuel K. Abbott, Salem, N. H., assignor to Joel D. Champion, Nashua, N. H.:

I claim the instep block fastener, composed of the bow spring, e, and the strap, d, arranged with respect to one another and the remainder of the last, substantially in manner and so as to operate as described.

46,175.—Washing Machine.—George N. Bolles (assignor to S. W. Walker & Co.), Kalamazoo, Mich.:

I claim the rotating or reciprocating rotating tub, G, in combination with the self-adjusting or rising and falling follower, H, the guide-bar, J, on the framing, A, uprights, I, on the follower, H, hinged bar, K, and catch bar, L, all arranged substantially as and for the purpose specified.

[This invention relates to a new and improved clothes-washing machine of that class in which an ordinary wash tub is employed with a follower. The object of the invention is to obtain a washing machine of the class specified which may be operated with greater facility than hitherto, and perform the desired work expeditiously and in a perfect manner.]

46,176.—Ears for Paint Cans.—Charles F. Brand (assignor to Harris Brothers & Co.), Philadelphia, Pa.:

I claim combining the slips, a a, with the ears, D D, of paint cans, substantially in the manner and for the purpose above described.

46,177.—Fruit Basket.—W. H. Burridge, Cleveland, Ohio, assignor to Adams, Jewett & Co.:

I claim the herein described article when made and formed substantially as and for the purposes set forth

46,178.—Harvester.—Wm. F. Cochrane (assignor to himself and Warder & Child), Springfield, Ohio:

I claim, First, The combination of the girder side pieces, a a', with the end brackets, C C', and middle brackets, i2, substantially in the manner described for the purposes set forth.

Second, Constructing the frame brackets, C C' and i2, substantially as described, for the purpose of adapting them to either a right or left-hand machine.

Third, Constructing and arranging the sides, A A, of the frame substantially in the manner described, so as to permit them to be reversed and shifted from one side to the other, in order to change from a right to a left-hand machine, or vice versa, as set forth.

Fourth, The combination of the trifurcated brace, R, with the inner shoe tongue and frame, substantially as and for the purpose described.

Fifth, The combination of the driver's seat and footboard pivoted on the post, U, and connected by the rod, t, with the gage bar, v, as and for the purpose described.

46,179.—Harvester.—Wm. F. Cochrane (assignor to himself and Warder & Child), Springfield, Ohio:

I claim, First, Mounting the crank shaft in swiveling bearings, substantially in the manner described, for the purpose set forth.

Second, The combination of the shell-bracket, M, with the level wheel, N, and pinion, o, as described, for the purpose of protecting the gearing.

Third, Arranging the crank shaft between the frame timbers, a a, and within the bracket, C', as and for the purpose described.

Fourth, Mounting the counter shaft in the brackets, I M, constructed in the manner described and for the purposes specified.

Fifth, The combination of the driving wheel, spur pinion, pinion shaft and nut, J, with the main frame, substantially in the manner described, for the purpose of raising the frame as described.

45,180.—Harvester.—Wm. F. Cochrane (assignor to himself and Warder & Child), Springfield, Ohio:

I claim, First, The combination of the driving wheel, tubular axle, sleeved radius-bars and main frame, substantially as and for the purposes described.

Second, The shell-brackets, I I', constructed and combined substantially as and for the purpose as described.

Third, The combination of the shell-brackets and main frame, substantially as and for the purpose set forth.

Fourth, The combination of the radius-bars, shell-brackets and panels and ratchets, substantially as described, for the purpose of holding the frame at any desired elevation, as set forth.

46,181.—Harvester.—Wm. F. Cochrane (assignor to himself and Warder & Child), Springfield, Ohio:

I claim, First, A vibrating slotted link or guide, which embraces the arm or stall of a vibrating sweep rake, and positively controls the movements of the rake, substantially in the manner and for the purpose described.

Second, The combination of an automatic rake with a vibrating slotted link or guide and a gravitating stop latch, substantially in the manner described, for the purpose set forth.

Third, The combination of the rake arm with the swiveling socket or collar, f, substantially as described, for the purpose of varying the angle of the rake teeth relatively to the platform, as specified.

Fourth, Mounting a vibrating slotted link or guide, which positively controls the movements of an automatic rake, on an adjustable stud, g', as described, for the purpose of varying the path of the rake, as set forth.

Fifth, The combination of an automatic vibrating sweep rake, a vibrating guide and a tension brake, for the purposes both of diminishing the force with which the rake strikes the gavel and of holding the rake down upon the gavel when raking off.

Sixth, Driving an automatic rake through the center of the driving wheel and from the outer side thereof, substantially as and for the purposes described.

Seventh, The combination of the pinions, d d1 d3 d4, as described for the purpose of varying the speed of the rake, as set forth.

Eighth, A tension brake to regulate the force with which an automatic vibrating sweep rake drops upon the platform.

46,182.—Harvesters.—Wm. F. Cochrane (assignor to himself and Warder & Child), Springfield, Ohio:

I claim the combination with the horizontal main frame of a harvester of a swan-shaped vertical frame, C, substantially in the manner described, for the purposes set forth.

46,183.—Harvesters.—Wm. F. Cochrane (assignor to himself and Warder & Child), Springfield, Ohio:

I claim, First, The combination of the spur wheel, E, idle wheel, F, and pinion, G, with the crank shaft, G', substantially in the manner described, for the purpose set forth.

Second, Mounting the rake gearing in the detachable frame or cdplate, H, as described, for the purpose set forth.

46,184.—Portable Lanterns.—Charles Deavs (assignor to E. P. Archer and George Pancoast), New York City:

I claim the combination of the candle tube, E, with the lantern case, A, when the tube is arranged so as to slide wtthin the case and capable of being shoved entirely within it and drawn out wholly or partially from it, substantially as and for the purpose herein set forth.

46,185.—Churns.—Alexander W. Hall, New York City, assignor to Almon & Albert Hall, Columbus, Ohio:

I claim the fixed attachment of the dasher of a churn to a stationary support, and the suspension of the tub, box, barrel, or body of the churn, in such relation to the stationary dasher that it and the contained milk may receive the necessary motion to produce the separation of the butter from the milk, substantially as herein described; or, in other words, I claim a churn with a stationary dasher and a movable body, substantially as herein set forth.

46,186.—Stop-motion for Circular Knitting Machines.—Philo W. Hart, Stamford, N. Y., assignor to the Dalton Knitting Machine Company, New York City:

I claim the movable pin or piece, c, in combination with the slide, I, or its equivalent attached to the bobbin stand, and with a groove or recess in the bobbin, substantially as and for the purpose herein specified.

46,187.—Combined Valise and Seat.—Stoughton B. Holden (assignor to himself and L. L. Holden), Woburn, Mass.:

I claim a combined valise and seat, composed of two parts, a a', connected by hinges, b, one part, a, being provided with a bottom or seat, B, and the other part with an internal lid, c,' and both parts supported by legs, D, when the device is used as a seat, the le s being removable, and all constructed and arranged as herein described.

[This invention relates to a new and improved combination of a valise and seat, whereby the valise when unfolded may be converted into a seat with abundant room to receive or hold different articles required for use by mechanics, artists, fishermen, etc, and the valise when folded capable of containing necessary clothing, besides the tools or articles above specified. For information, address L. L. Holden, *Herald* office, Boston, Mass. An engraving of the invention will soon be published in the SCIENTIFIC AMERICAN.]

46,188.—Brick Machines.—W. A. Horrall (assignor to himself and Albert W. Cross), Washington, Ind.:

claim so connecting the mechanism which drives the molds to the gear wheel on the pressure roller shaft that the mold and periphery of the pressure roller shall move in exact unison, by which their passage is facilitated and the clay evenly pressed, substantially as herein described and represented.

[This invention relates to a new and improved machine for pressing and molding bricks, and it consists in the employment or use of a mud mill, a pressure roller, clay box, and an endless band, all arranged in such a manner as to admit of the work being performed very expeditiously and in a thorough manner.]

46,189.—Machinery for Oiling Wool in Carding Machines.—John W. Hussey (assignor to himself and Geo. H. Quincy), Boston, Mass.:

First, In carding or other wool-preparing machinery and in combination with the pressure roller of an oiling apparatus of otherwise ordinary or suitable construction, I claim an independent scraper, or its equivalent, so arranged as to keep the pressure roller clear of the wool adhering to its surface.

Second, In combination with the pressure roller of an apparatus for oiling wool as it is fed to carding or other wool-preparing machinery, I claim an endless apron interposed between the said pressure roller and the top feed roller and moving in the direction of the said rollers, so that the surfaces in contact move in opposite directions, substantially in the manner and for the purposes set forth.

46,190.—Harvesters.—Samuel Johnston (assignor to himself and Rufus L. Howard), Buffalo, N. Y.:

First, I claim constructing a harvesting machine, which I call the "Great Western," with the finger beam located opposite or nearly opposite to the tread, and the gearing located mainly within the periphery of the driving wheel, and with the finger beam and gearing so arranged that both can be raised and lowered together to any desired hight, and still preserve the same relation to each other and the free working of the same, all constructed and arranged substantially as set forth and for the purposes described.

Second, I claim the standard, m m, located within the periphery of the driving wheel, the main plate, l l, and the perpendicular line shaft, e e, for supporting the finger beam and gearing and allowing them to be adjusted to the required hight, arranged substantially as described and for the purposes set forth.

Third, I claim the perpendicular grooved line shaft in combination with the feathered clutch, and arranged and constructed as described for the purposes herein set forth.

46,191.—Machine for indicating Carpenters' Squares.—Horace K. Jones (assignor to the Hart Manufacturing Company), Kensington, Conn.:

I claim, First, The method substantially as described for cutting the division marks on carpenters' squares and rules.

Second, The toes, i, and yielding beds, D, in combination with the gravers, a, applied and operating substantially as and for the purpose set forth.

Third, The screw clamps, g, applied in combination with the gravers, a, substantially as herein specified, for the purpose of holding them in their places and to govern the depth of the cuts.

[This invention consists in the use in a machine for indicating carpenters' squares, etc., of a series of gravers arranged on the circumference of a roller or cylinder and capable of making marks of different lengths; also, in combination with each graver, a toe and yielding bed, for the purpose of governing the length of the marks to be made; finally, in a clamp acting as gage to regulate the depth of the cut and to confine the graver.]

46,192.—Movable Calks and Toes for Horse Shoes.—Samuel Loyd (assignor to himself and Wm. H. Frear), Washington, D. C.:

I claim the calks, B B', constructed in the manner herein described and represented, and employed in connection with the screws, C C', in the manner and for the object specified.

46,193.—Steam Generators.—Barney McGinnis, New York City, assignor to himself and Reuben S. Torrey, Brooklyn, N. Y.:

I claim, First, The system of high-pressure boilers, B B', arranged in the interior of the shell or boiler, a, in the manner and for the purpose substantially as herein shown and described.

Second, The back flue, e, in combination with the double-walled shell, a, and return flue boilers, B, constructed and operating substantially as and for the purpose set forth.

[This invention consists in the arrangement of a system of high pressure boilers, calculated to carry steam of 200 (more or less) lbs. pressure to the square inch, in the interior of a double shell which forms a low-pressure boiler calculated to carry steam of 20 (more or less) lbs. pressure to the square inch, and connected in such a manner that the inner or high-pressure boilers can be supplied with water from the outer or low-pressure boiler, and if salt water or impure water is used all the sediment will be retained in the outer boiler, from which it can be readily removed. The inner boiler will be always supplied with clean water, and high pressure steam can thus be produced from salt water as well as from fresh water without injury to the boiler.]

46,194.—Machinery for Oiling Wool in Carding Machines.—John Shim (assignor to himself and Isaac Stead, said Stead assigns his right to Nicholas H. Graham), Philadelphia, Pa.:

In combination with a wool-oiling apparatus, I claim raising oil from the tank by a wick or capillary attraction, for the above-described purpose.

46,195.—Knapsack.—Jacob Weber, New York City, assignor to himself, Wm. Wharton, Jr., Philadelphia, Pa., and Ira B. Snyder, New York City:

First, I claim constructing the frame of a knapsack with jointed and folding sides, connected to a central section, C, substantially as above described.

Second, I also claim in a knapsack which is capable of being turned into a couch, supporting the outer folding rails, both when it is extended and when it is folded up, by means of brackets found on the supports, c, substantially as described.

Third, I also claim the combination with a folding knapsack, constructed substantially as above described, of a canopy and ribs, i, as set forth.

[This invention consists in a novel construction of knapsack, which is capable of being changed into a couch merely by opening it.]

46,196.—Lubricator.—Jean Francois August Aerts and Paul Francois Aerts (assignors to Jean Francois Aerts), Antwerp, Belgium:

We claim, first, In combination a shaft or axle, a reservoir of water or lubricating liquids or mixtures thereof, a brass or bearing, so grooved or channeled, substantially as described, as to receive and carry water or fluid lubricating material to the rubbing surfaces, and a disk or wheel attached to and revolving with the shaft, so as to carry fluid lubricating material and supply to a brass, the combination operating substantially as set forth.

Second, We claim, in combination with an axle or shaft and a reservoir of water a channeled brass and a rotating disk and a close box, preventing the entrance of dust and the escape of water, and in which the joint between the box and the axle is closed by packing rings, applied substantially as described.

Third, We claim, in combination with a packing ring, making a joint with an axle, a concave or dishing protector attached to or making a part of a wheel or an axle, and acting substantially as described.

Fourth, We claim, in combination with a box and a reservoir of water a guard plate or disk, making a partition between the front inclosure of the box and a water-lifting apparatus, substantially as described.

46,197.—Manufacture of Molded Candles.—John Lyon Field, Lambeth, Great Britain:

I claim a molded candle, the lower end of which is made of a tapering form, substantially as represented and described, for the purpose set forth.

46,198.—Manufacture of Zinc.—James Webster, Birmingham, Eng. Patented in England May 18, 1864:

I claim as my invention extracting zinc from its ores by causing the latter to be brought into contact with molten iron or other metal in a close vessel.

46,199.—Flocked Cloth, Dyed or Printed.—Thomas Croply, Bridgeport, Conn., assignor to The American Water-proof Cloth Company, Brooklyn, N. Y.:

I claim an article or fabric prepared, dyed and printed, or either prepared, dyed or printed, with a face of flocks of wool, silk, fur or other material possessing the character and qualities herein set forth, as a new manufacture.

46,200.—Dyeing, Printing and Manufacturing of Water-proof Cloth.—Thomas Croply, Bridgeport, Conn., assignor to The American Water-proof Cloth Company, Brooklyn, N. Y.:

I claim the process, substantially as hereinbefore described, of preparing, dyeing and printing goods, having a surface of flocks of the character hereinbefore described.

RE-ISSUES.

1,856.—Pumps.—Wm. A. Bemis, Lyndon Centre, Vt. Patented Aug. 9, 1864:

I claim the two plungers, D D', the rods, E E', of which are connected by a lever, G, having rods, H, connected to it, and all arranged with a platform, F, to operate as and for the purpose set forth.

1,857.—Railroad Car Brakes.—John Davis, Alleghany City, Pa. Patented Oct. 20, 1863:

I claim, first, A brake for wheel vehicles, brought to bear on the wheel by a spring and a cessation or relaxation of the power applied to draw the vehicle, and retracted therefrom by the said drawing power, substantially as herein described, and for the purpose set forth.

Second, The arrangement of the bars, e and f, guide plate, d, brakes, c, springs, s, levers, p and q, rods, l j k m and n, swivel plate, 5, pieces, o and 7, and brace, v, the whole being constructed, arranged and operating in the manner and by the means herein described, and for the purpose set forth.

1,858.—Machine for Loading Metallic Cartridge Cases.—Charles H. Lavis, Philadelphia, Pa. Patented Aug. 9, 1864:

I claim, first, Raising the shell or case of the metallic cartridges, for the purposes as herein shown and described.

Second, The block, m, or its equivalent, for the purpose specified.

Third, The groove, l, in the loading wheel, for the purpose set forth.

Fourth, The combination of the block, m, and groove, l, as substantially described.

1,859.—Heater for Smoothing Irons.—William F. Shaw, Boston, Mass. Patented Sept. 1, 1857:

I claim the combination of a heating apparatus, in which gas or hydro-carbon vapors are used as or for fuel, with a stand or support, B, made so as to gather the heat and products of combustion, and conduct them into the chamber or interior of the iron, substantially as specified.

Second, I also claim making the flat-iron, D, with an ascending flue or flues, i i and h, inlet and discharge openings, k and l l, arranged in the body of the iron, and so as to be used with a burner and stand, substantially as specified.

I also claim so constructing the stand or rest, n, for sustaining the handle of the flat-iron, as to cause the face of the iron to take an inclined position, as and for the purpose specified.

I also claim making the stand or support, B, with a tubular projecting neck, as and for the purpose specified.

1,860.—Coating Barrels to Render them Oil-tight.—The U. S. Barrel-coating Company, New York City, assignees by mesne assignment to Albert J. Hook and J. H. Darlington. Patented June 7, 1864:

I claim, first, Sealing barrels and other vessels by means of a compound of glue and molasses, or their equivalent, substantially as and for the purpose above described.

Second, Subjecting the said composition, after it has been applied to the vessel under treatment, to the action of tanning, substantially as and for the purpose above described.

DESIGN.

2,027.—Revolving Pistol Handle.—George A. Hickcox, Brooklyn, N. Y.

EXTENSION.

Trigger-operating Revolving Fire-arms.—Stanhope W. Marston, New York City. Patented Jan. 7, 1851. Re-issued Aug. 21, 1860:

I claim, first, So constructing the lock of revolving breech fire-arms, which may be operated by trigger, as that the hammer when raised to full cock, preparatory to firing, may be retained in that position of unstable equilibrium until the piece is fired on a further pressure of the trigger, by means of a vibrating tooth or fly tumbler, independently of any dog, pawl, catch or other mechanical device for that purpose.

Second, So constructing and arranging the lock of revolving breech fire-arms, susceptible of operation by trigger, as that when the hammer is raised to cock, preparatory to firing, the trigger shall be held back or retained in a drawn position by means of a vibrating tooth or fly tumbler.

Third, The use in revolving breech fire-arms of a vibrating tooth or fly tumbler interposed between the hammer and trigger, and operating substantially as hereinbefore described, by an upward pressure on the hammer, so as gradually to increase the leverage, and consequently the power applied to raise the hammer, and thereby reduce the effective resistance of the main spring, for the purpose of securing steadiness of aim, and greater ease in firing, and also to allow the recovery of the trigger, after firing, for repeated action.

NOTE.—The above long list of claims indicates the activity of inventors, and the prosperity of this very useful class of our community. There has come to our knowledge, latterly, a number of transactions between patentees and purchasers of rights where the former have received very large sums of money for their patents. One sale was made in our office a few days ago, when an inventor received $5,000, cash, for a partial interest in an invention, before the party had even taken any steps to secure his patent. Some idea may be formed of the activity among inventors when we state that over 200 applications for patents were made through the Scientific American Patent Agency alone during the past month—January. FIFTY THREE patents in the above list were secured through this office.—EDS.



PATENTS

GRANTED

FOR SEVENTEEN YEARS.

MUNN & COMPANY,

In connection with the publication of the SCIENTIFIC AMERICAN, have acted as Solicitors and Attorneys for procuring "Letters Patent" for *new inventions* in the United States and in all foreign countries during the past *seventeen years*. Statistics show that nearly ONE-THIRD of all the applications made for patents in the United States are solicited through this office; while nearly THREE-FOURTHS of all the patents taken in foreign countries are procured through the same source. It is almost needless to add that, after *seventeen years'* experience in preparing specifications and drawings for the United States Patent Office, the proprietors of the SCIENTIFIC AMERICAN are perfectly conversant with the preparation of applications in the best manner, and the transaction of all business before the Patent Office; but they take pleasure in presenting the annexed testimonials from the three last ex-Commissioners of Patents.

MESSRS. MUNN & CO.:—I take pleasure in stating that, while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE CAME THROUGH YOUR HANDS. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the office, a marked degree of promptness, skill, and fidelity to the interests of your employers. Yours very truly,

CHAS. MASON.

Judge Mason was succeeded by that eminent patriot and statesman, Hon. Joseph Holt, whose administration of the Patent Office was so distinguished that, upon the death of Gov. Brown, he was appointed to the office of Postmaster-General of the United States. Soon after entering upon his new duties, in March, 1859, he addressed to us the following very gratifying letter.

MESSRS. MUNN & CO.:—It affords me much pleasure to bear testimony to the able and efficient manner in which you discharged your duties as Solicitors of Patents, while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and I doubt not justly deserved) the reputation of energy, marked ability, and uncompromising fidelity in performing your professional engagements.

Very respectfully, your obedient servant,

J. HOLT.

Hon. Wm. D. Bishop, late Member of Congress from Connecticut, succeeded Mr. Holt as Commissioner of Patents. Upon resigning the office he wrote to us as follows:

MESSRS. MUNN & CO.:—It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your agency; and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully, your obedient servant,

WM. D BISHOP.

THE EXAMINATION OF INVENTIONS.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a written reply, corresponding with the facts, is promptly sent, free of charge. Address MUNN & CO., No. 37 Park Row, New York.

As an evidence of the confidence reposed in their Agency by inventors throughout the country, Messrs. MUNN & CO. would state that they have acted as agents for more than TWENTY THOUSAND inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of inventors and patentees, at home and abroad. Thousands of inventors for whom they have taken out patents have addressed to them most flattering testimonials for the services rendered them; and the wealth which has inured to the individuals whose patents were secured through this office, and afterwards illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! Messrs. MUNN & CO. would state that they never had a more efficient corps of Draughtsmen and Specification Writers than those employed at present in their extensive offices, and that they are prepared to attend to patent business of all kinds in the quickest time and on the most liberal terms.

PRELIMINARY EXAMINATIONS AT THE PATENT OFFICE.

The service which Messrs. MUNN & CO. render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there; but is an

opinion based upon what knowledge they may acquire of a similar invention from the records in their Home Office. But for a fee of $5, accompanied with a model, or drawing and description, they have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a patent, &c., made up and mailed to the inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through the Branch Office of Messrs. MUNN & CO., corner of F and Seventh streets, Washington, by experienced and competent persons. Many thousands of such examinations have been made through this office, and it is a very wise course for every inventor to pursue. Address MUNN & CO., No 37 Park Row, New York.

THE VALIDITY OF PATENTS.

Persons who are about purchasing patent property, or patentees who are about erecting extensive works for manufacturing under their patents, should have their claims examined carefully by competent attorneys, to see if they are not likely to infringe some existing patent, before making large investments. Written opinions on the validity of patents, after careful examination into the facts, can be had for a reasonable remuneration. The price for such services is always settled upon in advance, after knowing the nature of the invention and being informed of the points on which an opinion is solicited. For further particulars address MUNN & CO., No. 37 Park Row, New York.

Notes and Queries

J. J., of Vt.—We are pleased that you appreciate the value of our articles on lathe tools, and your suggestion to give a similar series on the hand lathe will be duly considered.

E. H. H., of Mass.—Antimony has the property of expanding as it cools; it is therefore used in type metal to make the alloy fill the mold. We know of no way of preventing the tin coating on your rods from wrinkling; it could be made smooth by rnishing.

S. A., of Iowa.—Very many substances are used for removing incrustations in steam boilers. The nature of the scale is different in different localities, and what is efficient in one case is totally useless in another. Winan's Incrustration Powder is said to have been efficacious in many boilers.

H. C. W., of Conn.—Address Jas. G. Stevenson, No. 200 Broadway, who manufactures turbine wheels.

W. T. B., of Mass.—We know of no metal as hard as brass which can be turned and filed like it. Perhaps type metal might answer your purpose.

C. O. P., of Ind.—For a gas engine address the *American Gas-light Journal*.

W. R. R., of Pa.—In general, a patent only covers the use of the device for the purposes set forth in the specification.

E. B. G., of N. Y.—An ownership in a patent is liable to seizure and sale for debt like any personal property.

Money Received

At the Scientific American Office, on account of Patent Office business, from Wednesday, January 25, to Wednesday, February 1, 1865:—

J. N. E., of N. Y., $12; A. M. H., of N. Y., $25; W. G. W. J., of N. Y., $12; B. & H., of N. Y., $25; F. W. C., of N. Y., $25; G. L. S., of N. Y., $25; P. E., of N. Y., $25; J. L. C., of N. Y., $25; J. G. M., of N. J., $25; S. G., of Pa., $20; G. & C., of Conn., $20; J. D. W., of N. Y., $40; P. J., of N. Y., $20; L. W. W., of Mass., $20, J. B., of N. Y., $15; J. M. M., of N. Y., $20; O. E. M., of N. Y., $15; J. F. W., of N. Y., $15; P. S. H., of N. Y., $15; A. T., of Conn., $20; J. F. L., of Mich., $20; L. D., of Cuba, $15; T. M. L., of N. Y., $20; N. H., of N. J., $20; J. T., of N. Y., $20; W. A., of N. Y., $22; B. & F., of Eng., $20; E. S. M., of Conn., $10; A. O., of N. Y., $15; J. McC., of N. Y., $15; P. C., of Pa., $20; W. E. C., of Ill., $20; I. N. S., of Ill., $45; E. C. S., of N. H., $30; R. N., of N. Y., $40; G. W. M., of Mo., $40; J. E. M., of Ohio, $41; C. C., of N. Y., $45; E. C., of Mass., $10; G. H. G., of N. Y., $15; W. L. J., of N. Y., $55; H. B. M., of Mich., $45; F. K., of N. Y., $15; N. H., of N. Y., $45; T. S., of Cal., $20; C. H. H., of N. Y., $20; I. A. P., of Ill., $20; C. F., of Ill., $20; G. M. W., of N. Y., $15; D. F. H., of Mich., $45; E. H., of N. Y., $15; E. B., of Ind., $20; G. A., of Mich., $22; W. N. B., of Ind., $20; S. H. M., of Ill., $20; J. L. R., of Ohio, $35; G. E. B., of Mass., $45; S. H., of Ill., $45; R. G., of N. Y., $15; H. H. W., of N. Y., $50; J. S., of N. Y., $15; A. J. N., of R. I., $45; M. V. C., of Mo., $20; T. R. T., of N. Y., $385; D. S. A. of N. Y., $100; W. O. B., of N. J., $15; O. A. R., of N. Y., $15; C. G., of Mass., $16; W. T. H., of Md., $15; W. H. C., of Me., $25; J. H., of Pa., $25; J. S., of Ohio, $15; W. & T., of Vt., $15; G. D. G., of N. Y., $60; B. & McN., of Mich., $15; G. E. S., of Mass., $15; C. J. H., of Iowa, $20; R. M., of C. W., $35; H. W. G., of Ohio, $26; H. L. B., of Pa., $30; J. A. W., of N. B., $15; A. W. F., of Vt., $15; J. L. K., of Pa., $35; W. S. R., of Conn., $15; D. H., of N. Y., $10; E. B., of Wis., $16; H. J., of Ind., $10; V. W. B., of Vt., $15; J. C., of Ill., $30; C. J. F., of Iowa, $25; B. H., of Ill., $25; S. & G., of R. I., $25; A. J., of Pa., $25 S. M. F. R., of Ill., $25; J. L. G. B., of Mo., $16; J. N. P., of N. Y., $16; D. C., of Wis., $15; J. E. W., of Ill., $15; A. B., of N. Y., $50; C. & R., of N. Y., $16; J. W. A., of N. H., $15; W. G., of Mich., $16; T. C., of Ohio, $10; A. M. D., of Ill., $20; J. T. B., of Cal., $15; W. T. R., of Ill., $16; J. W. F., of Cal., $40; T. H., of Mo., $16; J. P. G., of Mo., $15; S. P. O. & Co., of Ill., $45; J. R., of Ind., $25; A. K., of Mass., $15; P. D., of Pa., $20; H. C. S., of Me., $15; J. S., of N. Y., $25; J. K., of N. Y., $25; A. M. O., of Ill., $25; N. K. & McC., of Ill., $16; E. B., of Mass., $25; C. B., of Mass., $150; G. H., of Ohio, $16; W. C., of Mass., $16; C. F., of Pa., $25; R. H. & J., of R. I., $15; C. B. B., of Mo., $16; C. R. R., of Conn., $50.

Persons having remitted money to this office will please to examine the above list to see that their initials appear in it, and if they have not received an acknowledgment by mail, and their initials are not to be found in this list, they will please notify us immediately, stating the amount and how it was sent, whether by mail or express.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office, from Wednesday, Jan. 25, to Wednesday, Feb. 1, 1865:—

J. N. E., of N. Y.; A. M. H., of N. Y.; W. G. W. G., of N. Y.; T. R. T., of N. Y.; B. & H., of N. Y.; F. W. C., of N. Y.; J. G. M., of N. J.; S. W. P., of Mass.; S. L. S., of N. Y.; P. E., of N. Y.; J. L. C., of N. Y.; J. D. W., of N. Y.; W. A., of N. Y.; R. N., of N. Y.; W. L. J., of N. Y.; H. H. W., of N. Y.; T. R. T., of N. Y.; A. J., of Pa.; T. H. C., of Mo.; J. S., of N. Y.; J. K., of N. Y.; A. M. O., of Ill.; S. & G., of R. I.; C. J. F., of Iowa; B. H., of Ill.; T. C., of Ohio; B. & H., of Mass.; J. E. P., of N. Y.; W. H. C., of Me.; J. L. H., of Pa.; J. C., of Iowa; J. K. & C. B. C., of Iowa; G. M. F. R., of Ill.; J. H., of Pa.; D. L., of R. I.; O. & J., of Ohio; N. D. LeP., of Ohio; E. B., of Mass.; C. F., of Pa.; J. B. T., of Conn.

RATES OF ADVERTISING.

TWENTY-FIVE CENTS per line for each and every insertion, payable in advance. To enable all to understand how to calculate the amount they must send when they wish advertisements published we will explain that eight words average one line. Engravings will not be admitted into our advertising columns, and, as heretofore, the publishers reserve to themselves the right to reject any advertisement they may deem objectionable.

TO BRICK-MACHINE MANUFACTURERS.—WANTED, by the advertiser, a machine of 2 horse power, capable of turning out 10,000 Bricks per day. Address THOS. H. SENIOR, No. 56 Gold street, N. Y. 1*

WANTED—A BRICK MACHINE OF THE MOST practical kind, with the latest and best improvements. Address JOSEPH MOSER, Highland, Madison Co., Ill. Drawings and descriptions are desired. 1*

PORTABLE ENGINES, FROM 8 TO 16-HORSE POWER, ready for immediate delivery. C. GAY, No. 29 Doane street, Boston, Mass. 7 13*

D. L. HARRIS & CO., SPRINGFIELD, MASS., Manufacturers of Machinists' Tools, Steam and Power Pumps Bridges, Turn Tables, Bolts, Etc. 7 10* W. H. BURRALL, Superintendent.

CLOTHING BUREAU, QUARTERMASTER GENERAL'S OFFICE, WASHINGTON, February 3, 1865.

ARMY SUPPLIES.—SEALED PROPOSALS WILL be received at the office of Army Clothing and Equipage, New York City, until 12 o'clock, M, on WEDNESDAY the 8th inst., for furnishing by contract at the depot of Army Clothing and Equipage, at New York City, Six-Mule Wagon Harness complete, to be made according to specifications, which can be seen at this office.

Bidders will state the quantity they propose to furnish and the shortest time in which they can deliver it.

All proposals should be accompanied by a proper guaranty for the faithful performance of a contract.

The United States reserves the right to reject all bids deemed objectionable.

Proposals should be indorsed, "Proposals for furnishing Harness," and addressed to Bt. Brig.-Gen. D. H. VINTON, 1 D. Q. M. General, New York City.

SOMETHING NEW IN THE PERIODICAL LINE.—BRILLIANT AND SPARKLING—CHEAP AND GOOD!—COUSIN LIZZIE'S MONTHLY, a bright, sparkling, dashing little craft, full to the brim of good things in the way of stories, sketches, poetry, etc. Beautifully printed and illustrated, and one of the handsomest, best, and most amusing publications ever issued. A sure cure for the blues. A large package of specimens (different numbers) sent free of postage for 25 cents. Cut this out and send for them, or preserve it for future reference. All who have seen Cousin Lizzie's Monthly are delighted with it, and we believe you cannot invest a quarter to better advantage. Address COUSIN LIZZIE, No. 48 Ann street, N Y. [Editors inserting this will receive copy one year free.] 1

A VALUABLE PATENT CHEAP.—FOR SALE—THE Patent Rights and Improvements of the best Dovetail Machine in the world. The only one that makes the genuine old-fashioned dovetail. It does the work perfect in wood and metal, and as good as can be done by the best mechanics. Here is an opportunity equal to the sewing-machine interest. For further particulars address the inventor, W. A. M'DONALD, 1* Mott Haven, Westchester County, N. Y.

WILLIAM MASON, MANUFACTURER OF PATENT Friction Clutches and Machinery, has sold his interest in the Machine Shop, Tools and Stock to V. Wm. Mason, who settles and continues the business. All favors will receive prompt attention. V. WM. MASON, 7 4* Providence, R. I.

TO RAILROAD COS. AND MACHINISTS.—FOR SALE—Two Planers, 24 in. square by 6 ft. Not cheap, but first-class tools, well finished, strong and heavy; can be delivered at once. Four heavy, 36-in Lathes, 18-ft. shears, partially completed and not yet sold. Address E. & A. BETTS, Tool Builders, Wilmington, Del. 7 4*

PARTIES WISHING AN AGENT TO INTRODUCE small patented articles and solicit orders in Massachusetts can hear of a responsible one by addressing (stating their best terms) L. D. H., Box 452, Milford, Mass. 1*

CAST-STEEL RAKE TEETH, OF A SUPERIOR quality, made to any pattern required, at low rates. No extra charge for coiling teeth. Address C. COLEMAN, Allegheny City, Pa. 7 12*

E. C. STRANGE, MANUFACTURER AND DEALER in Box-bound Shingle and Stave Machines, Cylinder Saws, Stave Planers, Barrel and Nail-keg Heading Machine, No 20 Broadway, Taunton, Mass. 7 6*

A SECOND-HAND GRAY & WOOD'S PLANER, with an Attachment for Planing Boards, for sale by F. W. BACON & CO., No. 84 John street, New York. 7 3

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A Great Country for Americans.

According to the London correspondent of the *Herald*, England is a favored land for Americans and American inventions. This is what the individual in question says :—

This great, great, very great country of Great Britain would like to be quite independent of the United States of America, and hear no more of her in any form. But your presence is felt every day, morally, socially, politically, commercially, financially and in every other way. Your corn fields supply them with bread, your ships bring it to them and carry away their products and their surplus population ; your cotton keeps their manufactures in a flourishing condition, or did, and gives them a large sum for their Treasury. In machinery they are indebted to you to an almost endless extent. Perhaps they divide with you—as each nation claims both inventions—the honor of developing steam power and making the lightning telegraph. American mowing and reaping machines cut down their grass and gather their harvest, while American invented cotton gins are made here to send to India, China, Australia, Egypt, Southern Europe, Northern Africa and South America. Hoe's New York printing machines work off all their largely circulated newspapers and periodicals, and one daily journal boasts that with stereotyped forms their "Hoe" prints eighty thousand copies an hour. There never was a nail machine to make cut nails in the kingdom till about thirty years ago, when one was brought from America.

I suppose you've seen a nail machine,
'Tis all the people's wonder, O;
It thumps away both night ahd day,
And makes a noise like thunder, O.
Such cracks and jams, like batteriug rams,
Which keep such a pelting, pouncing, O,
That all the ground it shook around,
By reason of the jouncing, O.

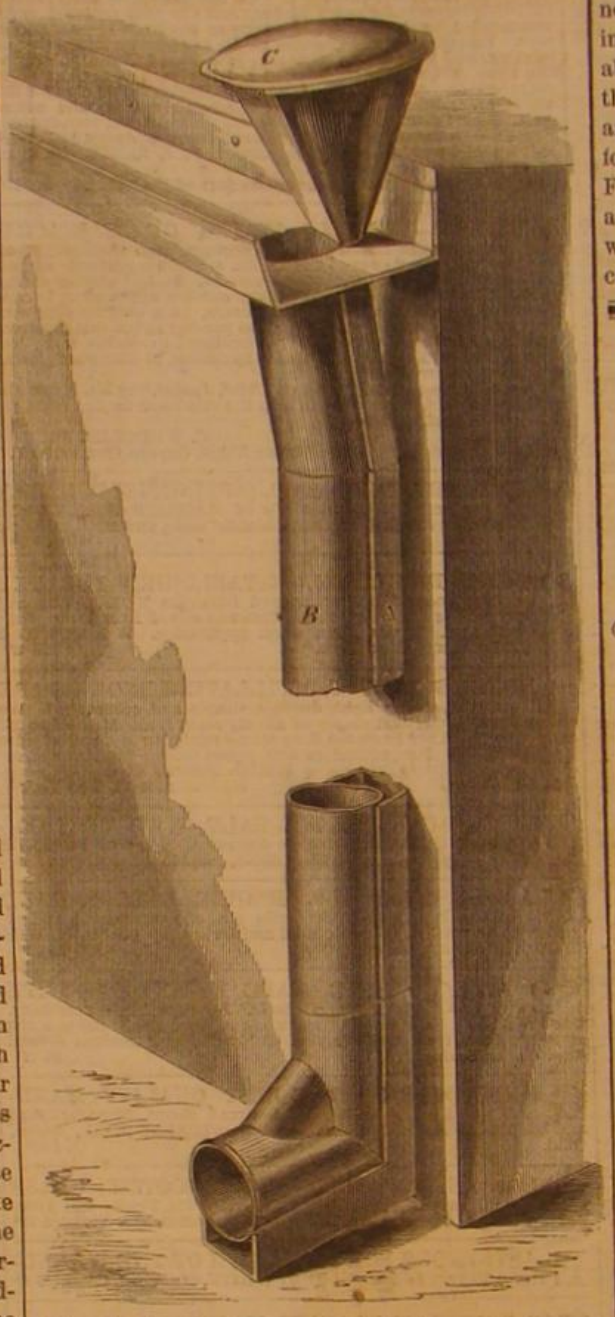
The rifles they make to fight their enemies are all fabricated by machinery invented by a Yankee and made in Connecticut. Every city, town, village and hamlet, and half the habitations, from the lordly castle and mansion to the peasant's cottage, are supplied with New England clocks. Their bank vaults and safes, to be safe at all, must be secured by American locks. At least three hundred thousand American sewing machines are in constant use to make their clothing, affording large incomes or gigantic fortunes to nearly a dozen American patentees and manufacturers. One extensive manufacturing firm—the house of Welch, Margetson & Co., of Cheapside, who make collars and neck ties by the million—employ some twelve hundred sewing machine hands, and work nearly a thousand machines, and they have found it expedient to manufacture their own machines, making one of combined action from expired patents and minor inventions that they have purchased. All the planing and wood dressing machines in use are of American invention. After being beaten in every water clear round the world from the Isle of Wight to Botany Bay, they copied your yachts and clipper ships; and now they are making monitors and cupola ships to replace their old tubs of iron and wood that are found to be useless. Your thousand pounder guns they will have to copy soon, as they have nothing to equal or come near them.

An enterprising American named Thompson, comes here with one of the grandest inventions, that would build boats in hours that formerly repuired days, which reduced the cost one half, and would have tripled the number built, so they could have supplied the world; but no sooner was a company formed to utilize the invention and fairly at work, than their inefficient laws and loosely-organized and lawless combinations of hand-grubbing laborers got up mobs, broke the machinery and ruined the company, after they had spent half a million of dollars, not one dollar of which was saved.

American actors, actresses, opera singers, minstrels, lecturers, showmen, dwarfs and and other entertainers are realizing large incomes, while the spread and influence of American books and literature is increasing every year. Native born Americans come here, now and then, like Lyndhurst, and get to be peers, while several fair daughters of America are peeresses.

ROGERS'S RAIN CONDUCTOR.

Leader pipes are a source of great annoyance and expense in cold weather, for they frequently freeze up and burst, after which the water from the eaves drips down over the front of the building, rendering it unsightly, and injuring the masonry. The invention herewith illustrated is intended to supply a convenient means for thawing the leader pipe when frozen. If hot water be poured on at the top, it is soon as cold as the pipe itself. This invention provides for a pipe, A, at the back of the leader, B, by which the



hot water has free access or is in close contact with the pipe to be thawed, and thus accomplishes the object in a short time and with little trouble. The water is poured in through the funnel, C, and will not be liable to freeze in the pipe, A, through which it passes. A cap is provided to the funnel which excludes rain and snow therefrom, so that it is at all times open throughout its length. Patented Dec. 13, 1864, by F. P. Rogers, 1,431 Market street, Philadelphia. For further information address the patentee as above.

Distinguishing Features of the Cornish Engine.

"A Collier" writes the following interesting letter to the *London Morning Journal:*

Without doubt the Cornish engine and pumping arrangements are superior to any other in the United Kingdom, and I have seen every style in it. I have not a single remark to make upon it, but advise any one in want of a pumping engine to go to Cornwall, get a Cornish engine, plungers, boilers, and fit them up by Cornishmen, and work them by Cornish enginemen. I have seen attempts made to make them elsewhere, and all have been great failures, which I attribute to the tendency of a "native" to adopt some of his own hobbies. The modes of balancing, and of working expansively, are as near perfection as we shall get; and the systematized training of men, —at low wages, too, only 65s. per month—is worthy of imitation. The great points of the Cornish system, as already stated, are slow firing; careful cloth ing of engines, steam pipes, and boilers; expansion and condensation of steam; forcing sets and larg waterways; great strength (for steadiness) of rods and accurate balancing, which the use of balance bobs enables them to do so simply. Too little atten tion is paid to these points about collieries, and especially to size of rods and balancing, and it appears to me that the adoption of heavier rods, counterbalanced with balance-beams, would add much to the steadiness of our direct pumping engines. In "Bull" engines, or those where the cylinder stands directly over the pit, I believe the use of balance-beams would enable the steam to be used expansively, which is never done now, as far as I have observed. I was informed that this description of engine had been abandoned in Cornish mines for 50 years, in favor of the beam-engine now in use. Our best bell-crank arrangements, with rotary engines, consume at least four times the fuel of the ordinary Cornish engine. For example, the Cornish engine will do the work of an ordinary 20-in. cylinder high-pressure pit engine, working 24 4-ft. strokes for 24 hours, on 2 tons of coal.

TO
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Scientific American.
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JANUARY 1, 1865.

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Vol. XII.---No. 8. (NEW SERIES.)

NEW YORK, FEBRUARY 18, 1865.

$3 PER ANNUM (IN ADVANCE

Improved Helical Turbine.

The several engravings (Figs. 1, 2 and 3), published herewith, represent a turbine water wheel, combining the helical curve with the Jonval wheel proper, in a neat, compact and portable form. It can be set in the place of any common water wheel with the same expense of foundation, fluming, gearing, etc. The inventor's experience for the last twelve years in building the Jonval turbine, including his experiments at the Fairmount Water-works, Philadelphia, in 1859 and 1860, where he obtained a result of 6½ per cent over all other competitors, has enabled him to produce a turbine which, for simplicity of construction, durability and power cannot be equaled.

Fig. 2

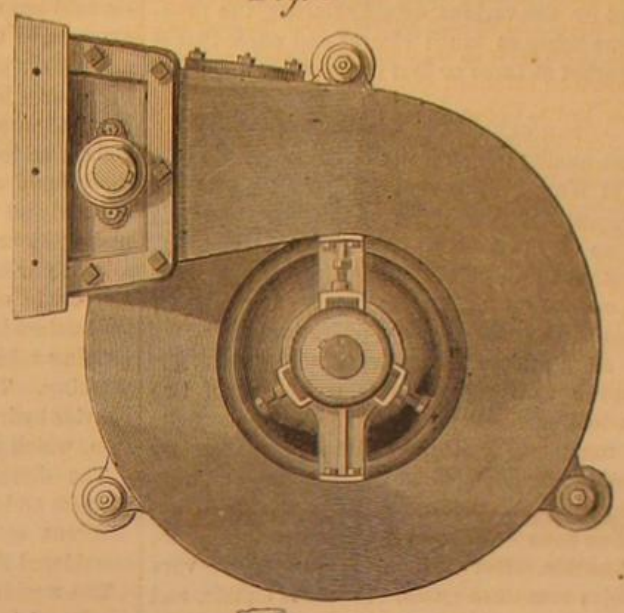
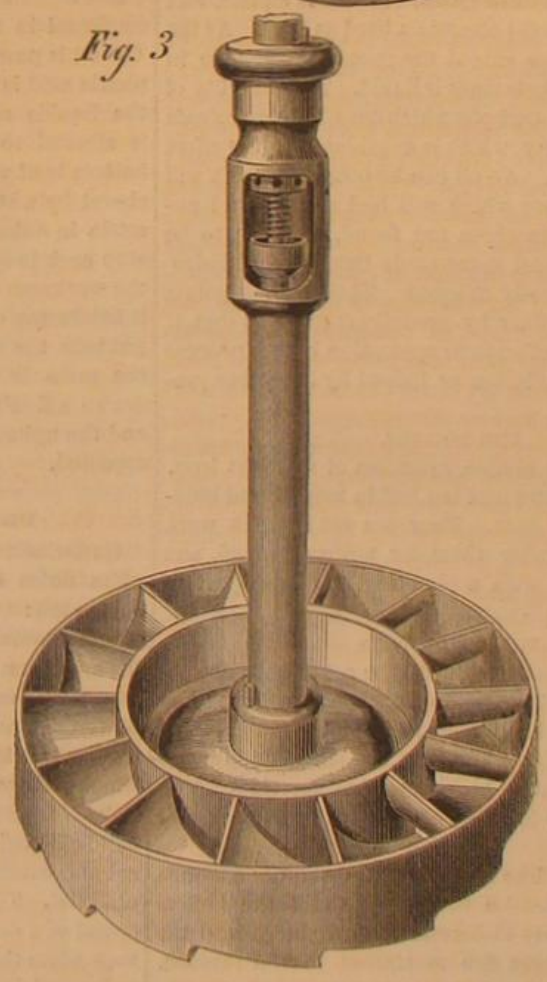
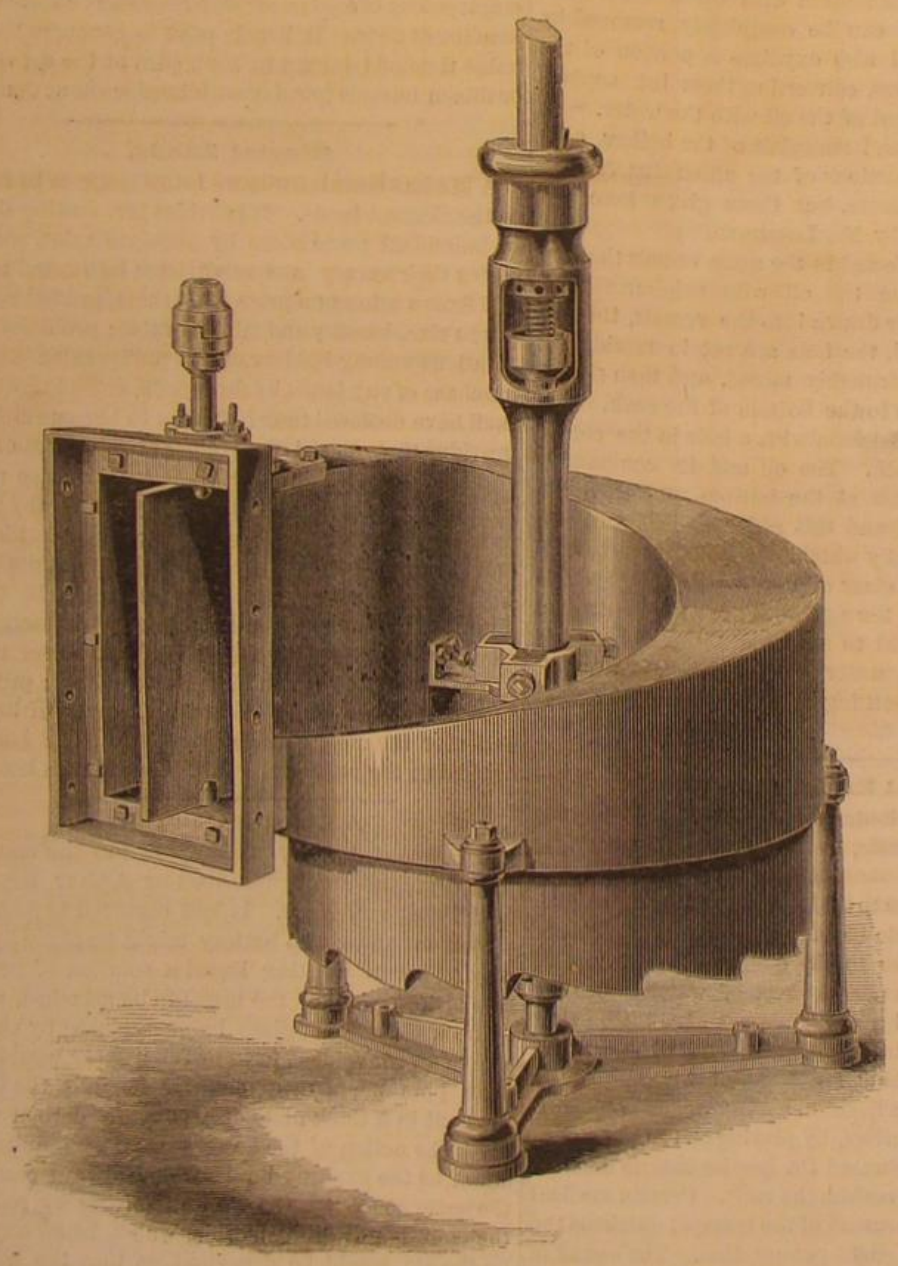


Fig. 3





STEVENSON'S HELICAL TURBINE.

Fig. 1 is a perspective view of the turbine complete. Fig. 2 is a plan or top view; and Fig. 3 is a view of the wheel and shaft.

The proportion of wheel, in the number of its buckets, form and size of its discharge openings, etc., are improvements which render it free from liability to clog up with anchor ice or any rubbish. The helix is so constructed that the velocity and force of the water acts upon all the buckets at once; the *vis viva* of the water is not lost by friction on the sides of the helix before acting on the wheel. The step is made of hardened steel and is of peculiar form; it is placed above the wheel, resting on a stationary spindle inside the hollow shaft which the wheel is keyed to, thus doing away with the large wooden step below the wheel, which causes a loss of power by friction. In the hollow shaft is an opening suitable for oiling and adjusting the step, and also for regulating the hight of the wheel to the helix by means of a screw and nut, so as to prevent loss of water from leakage. There can be no loss of power by the rubbing at the periphery of the wheel, caused by the lateral wear of the step, as in common scroll wheels after running a year or two. The power of the wheel can be perfectly regulated by the gate, and when machinery is thrown on and off, an ordinary governor will keep a uniform speed. These wheels are applicable to all mill powers, and can be furnished from twelve inches diameter up to seven or eight feet, in a reasonable time after the order is given. If properly put up and geared, 80 per cent of useful effect will be obtained; the experience of the last few years has fully warranted this assertion. For further information address J. E. Stevenson, Hydraulic Engineer, 200 Broadway, New York, upon whose improvements patents are now pending through the Scientific American Patent Agency.

On the occasion of the new year, the Emperor presented to the son of Prince Napoleon an automaton toy, representing a gardener with a barrow. The figure walks backwards and forwards, and turns its head in the most natural manner, at the same time wheeling before it whatever may be put in the barrow.

VISIT TO A PETROLEUM REFINERY.

THE GENERAL PROCESS.

Petroleum as it is raised from its caverns in the rocks is a dark and dirty liquid, so disagreeable in its appearance that for forty years after its existence in this country was known it failed to come into general use. But, fortunately, an easy and simple process of purifying it has been discovered, which leaves it the most transparent, beautiful and perfect of all illuminating materials. Petroleum is refined by first distilling it, then agitating it with sulphuric acid, then adding caustic soda to remove the acid, and finally washing the oil perfectly with water. Some refiners also use certain other chemical agents to more thoroughly bleach and deodorize the oil, and in consequence of these delicacies in the manipulations, there is a difference in the quality of the oil turned out by the various establishments, the product of some being so much clearer and purer that it sells in market at three or four cents per gallon more than others.

THE OLEOPHENE OIL WORKS.

The best quality in market is produced at the Oleophene Oil Works, situated at Hunter's Point, Long Island, opposite the upper portion of this city; this is also one of the largest refineries in the country. We recently had an opportunity of going over these works in company with Mr. Leserman, the manager, who explained to us the several operations.

SOME PROPERTIES OF PETROLEUM.

It is known that petroleum is composed of two elements, hydrogen and carbon. These two elements combine together chemically to form a large number of chemical compounds, which are mechanically mixed together to constitute petroleum. These hydro-carbons have one property in common, they are all combustible. But their other properties vary very widely; some are gases, others are liquids, and one at least is a solid almost as hard as lead. As the solids, and to some extent the gases, are soluble in the liquids, the whole mass is liquid. The volatility of the several hydro-carbons which constitute petroleum is the first property which is considered in the effort to separate them. An oil can be obtained which will boil at 90°, another which will boil at 91°, and another at 92°; even these are found, however, to be not single chemical compounds but several hydro carbons mechanically mingled. Their boiling points differ from each other by gradations so small that it is impossible to effect their separation by the process of fractional distillation or indeed by any other process yet known.

THE BOILERS.

The boilers are simple cylinders of wrought iron, five feet in diameter and ten feet in length, and holding fifty barrels each. They are set in brick work with furnaces under them for anthracite coal, and each is provided with a pipe from its upper part to lead the vapor to—

THE CONDENSERS.

These are worms of copper pipe set in tubs or vats of cold water. The pipe of each condenser is 100 feet in length and 2½ inches in diameter at the larger end near the boiler. The vats are six feet in diameter and nine feet in hight, being of sufficient depth to allow three or four feet of water above the worm.

DISTILLING.

As petroleum, like most other substances expands by heat, care must be taken not to fill the boilers quite full. About 45 barrels are introduced into the boiler, and a bright fire is started in the furnace. The more volatile of the hydro-carbons are first evaporated, and as the vapor is driven into the coil of cold pipe it is condensed, and flows out at the lower end. Then follow the less volatile portions; and in the course of from 40 to 48 hours the whole charge is driven over with the exception of four or five per cent of the non-volatile matter, which remains in the form of a dirty tar. The fire is now drawn, and when the boiler is sufficiently cooled the workmen enter it through a man-hole provided for the purpose, and scrape out the residuum.

As the oil flows from the condenser it is divided into three portions for different uses. The lightest, that comes over first, is called gasolene. This cannot be used in lamps with safety, as it rises in vapor so freely that it mixes with the atmospheric air to form an explosive compound. It is employed to some extent for making an illuminating gas by mixing its vapor with air. Its specific gravity ranges from 80° to 90° of Beaume's scale.

The next that comes over, ranging from 60° to 80° is separated and sold under the name of benzine. This is used in mixing paints and varnishes, and for purposes generally for which camphene was formerly employed.

The last of the distillation, constituting the principal portion of the petroleum, is illuminating oil. This ranges in density from 35° to 60°. As the stream of oil flows out from the lower end of the condenser its color is a light, delicate blue. The tar is sold for making illuminating gas, and considerable quantities are sent to Europe, where it is said to be employed in manufacturing dyes.

THE AGITATORS.

The vessels in which the oil is treated with sulphuric acid are upright wooden casks some 8 feet in diameter and 9 or 10 feet in hight; they are lined with sheet lead, and provided in the interior with revolving fans which are driven by steam power. After being thoroughly mixed with sulphuric acid, caustic soda is added to remove the acid, and then the oil is thoroughly washed with water.

Nearly all the hydro-carbons of petroleum are neutral—neither acid nor alkaline—but a few have alkaline or basic properties, and it is from these that the crude oil derives its offensive odor. Sulphuric acid enters into combination with these basic oils, forming salts which can be completely removed by washing. The acid also oxydizes a portion of the heavier hydro-carbons, converting them into asphaltum, which settles out of the oil with the water.

The dimensions and materials of the boilers, condensers and other portions of the apparatus vary in different establishments, but those given here are considered the best by Mr. Leserman.

The washing is effected in the same vessels that are employed in treating the oil with sulphuric acid. The oil is pumped or drawn into the vessels, the sulphuric acid is added, the fans are set in motion till the liquids are thoroughly mixed, and then the oil is allowed to settle to the bottom of the cask. The bottom is of a conical form with a hole in the center closed by a stop cock. The oil and its compounds settle in a dark mass at the bottom, and then the stop cock is opened and this sediment is drawn off, the workman carefully watching the flow so as to stop it before any of the clear oil escapes. Next, soda is put into the cask, the agitators are driven awhile, the mass is allowed to settle, and the sediment is drawn off. Finally, water is pumped in with the oil, and the agitating, settling and drawing off process is repeated.

Physical Effects of Music.

Gottschalk contributes to the *Atlantic Monthly* some notes on music, from which we extract this paragraph:

"It communicates to the body shocks which agitate the members to their base. In churches the flame of the candle oscillates to the quake of the organ. A powerful orchestra near a sheet of water ruffles its surface. A learned traveller speaks of an iron ring which swings to and fro to the sound of the Tivoli Falls. In Switzerland I excited, at will, in a poor child afflicted with a frightful nervous malady, hysterical and cataleptic crises, by playing on the minor key of E flat. The celebrated Dr. Bertier asserts that the sound of a drum gives him the colic. Certain medical men state that the sound of the trumpet quickens the pulse and induces slight perspiration. The sound of the bassoon is cold; the notes of the French horn at a distance, and of the harp are voluptuous. The flute played softly in the middle register calms the nerves. The low notes of the piano frighten children. I once had a dog who would generally sleep on hearing music, but the moment I played in the minor key he would bark piteously. The dog of a celebrated singer whom I knew would moan bitterly, and give signs of violent suffering, the instant his mistress chanted a chromatic gamut. A certain chord produces on my own sense of hearing the same effect as the heliotrope on my sense of smell and the pineapple on my sense of taste. Rachel's voice delighted the ear by its ring before one had time to seize what was said, or appreciate the purity of her diction.

"We may affirm, then, that musical sound, rythmical or not, agitates the whole physical frame—quickens the pulse, incites perspiration, and produces a pleasant momentary irritation of the whole nervous system."

Corn Shellers Wanted.

A correspondent of the *Country Gentleman* says:—

"Living as I do, in the midst of a pretty extensive corn-growing country, in common with many others, I wish to obtain information as to the best hand power corn sheller in use. A good hand sheller is an implement much needed among farmers. Such a machine would meet with a ready sale in this section, if it could be found. What I regard as desirable qualities in such a machine are—1st. Rapidity of shelling—2d. Ease of execution—3d. Shelling clean—4th. Separating the cobs from the corn, depositing the cobs in one basket and the corn in another. Do you know of any machine superior to the old Clinton sheller?"

The editor of the journal says:—

"We do not know of a better hand sheller than the Clinton, although there are some others that we think quite as good. It needs careful experiment for a season or two, with the different kinds to enable one to say positively which is best. But we cannot strongly recommend any hand-sheller, unless it be to furnish an occasional grist for family use, a feeding for chickens, or a small quantity for planting. Now that labor is so high priced, and so many farmers are furnished with horse-power, a good horse-machine ought to be employed by every farmer who raises any considerable amount of corn. It hardly pays to consume the valuable time of laborers to shell corn at the rate of ten or fifteen bushels per day with hard work at that."

Mineral Lands.

A bill has been introduced into Congress in regard to the mineral lands. It provides for vesting the fee in individual proprietors by absolute sales, contemplates their survey and subdivision into small tracts, and fixes a minimum price upon them, graded according to size, locality and mineral value; prohibits combinations among bidders at the public sales, and the purchase of any lands by foreigners, except those who shall have declared their intention to become citizens; provides that actual discoverers and workers of mineral lands shall have the right to purchase at the minimum price; limits the quantity which any single purchaser may buy to forty acres; requires the gold and silver produced to be coined in the mints of the United States; empowers the President to lay off the mining regions into suitable coining districts, and compels miners to have their gold and silver coined in the districts in which they are extracted; provides that purchasers shall first take the oath of loyalty, and that the net proceeds of sales of these lands be applied to the payment of the United States bonds.

A Constant Battery.

A constant battery to be applied to the manufacture of magnesium is described by Arthur Reynolds in the *Chemical News*. It had occurred to him that a constant and cheap battery might be made by employing for an exciting liquid a solution of perchloride of iron, and for the metal to be attached, metallic iron, the copper-plate being replaced by carbo The most convenient form of the battery would l have pots made of carbon for holding the liquid. Slits cut in a thick plate of gas retort carbon would do. The action of the battery would be quite constant, as the exciting liquid would always remain in the same condition, the iron dissolving by reducing the solution to protochloride, which, being oxydized by the air, would be deposited, so that the solution would always remain of the same strength. This would be as cheap, or cheaper, than any other form of battery, and perpetually constant, and the same acid would do for a long time. The purpose for which he proposes to employ the battery is to the manufacture of magnesium from sea-water. The sea-water should be evaporated with a little chloride of calcium, and after the main bulk of the common salt and sulphate of lime has crystalized out the solution should be evaporated to dryness, the dry mass melted, and decomposed by the voltaic battery before described.

The most Profitable Patent ever Obtained.

By an extract in another column it will be seen that the London *Engineer* states Bessemer's receipts from his patent for making steel, at $500,000 a year.

IS THE BLOCKADE EFFECTIVE?

Facts are better than fancies, and statistics are more reliable than loose opinions from prejudiced sources. For years the enemies of the Government, and of the Navy Department in particular, have kept up a bitter tirade against it on account of its assumed want of care or watchfulness in blockading the Southern ports. Did a British vessel succeed in entering Charleston, vials of wrath and vituperation were poured out upon every one in the navy, from the Secretary down to the mess cook, and some papers were so unscrupulous as to assert that naval officers connived at the entrance of the blockade runners, being paid for so doing.

The London *Engineer* publishes a letter from its Liverpool correspondent showing the net results—profit and loss, as regards the number of ships built, captured and now running, which presents the subject of the efficiency of the blockade in a very different light from that in which it is exhibited by our own disloyal journals.

It appears that the whole number of vessels built from 1862 to 1864, was 111. The fate that befell them is thus stated:—Destroyed, 23; captured, 48; still running, 29; on the way out, 11. The "still running" list must be decreased somewhat, for the Liverpool correspondent was not aware that some half a dozen would be captured between the time of his letter and its reception in America. The cost of this fleet was $8,500,000, estimating the pound sterling at $5, net. Besides the men employed in the building and engineering of these vessels, there were 3,300 other men taken from the commerce of the Clyde. Of this vast fleet of blockade runners—far larger in fact than the steam navy of the United States before the war—one half has been captured, and nearly one-fourth destroyed, while the loss of men and money to the builders and owners has been very great. These unadorned facts are a sufficient answer to the oft-repeated statement that the blockade of the Southern coast has been defective.

WOOL FROM PINE TREES.

A correspondent has very kindly copied and sent to us an article from *Chamber's Journal*, of 1852, giving an account of a wonderful discovery by a German chemist of a chemical process for obtaining wool from the leaves of pine trees. The leaves are stripped from the trees by hand, and treated by the process, which results in dissolving the resinous portions and leaving the fibers separated in the form of "wood-wool." The article states:—

"It was found that, at the end of five years, a wood-wool mattress had cost less than one made of straw, as the latter requires an addition of two pounds of new straw every year. In comparison with horse-hair, it is three times cheaper; it is safe from the attack of moths, and in a finished sofa no upholsterer would be able to distinguish between wood wool and hair stuffing. It has been further ascertained that this wool can be spun and woven. The finest gives a thread similar to that of hemp, and quite as strong. When spun, woven and combed, a cloth is produced which has been used for carpets, horse-cloths, etc.; while mixed with canvas warp it will serve for quilts, instead of being employed in the form of wadding."

The whole article is a puff in the same strain, without any description of the process, the only thing that would be of any interest to either ourselves or our readers. We always distrust accounts of great results produced by secret processes, especially if they purport to have been discovered by an unknown chemist. When Bunsen, Kirchoff, Liebig, or any other great master of chemical science makes a discovery, he hastens to lay it before the world in all its minute details. If a German or other chemist offers to sell a secret process which will produce some wonderful results it is pretty safe to conclude that he is a charlatan and a swindler.

Report of the Ordnance Department on Stevenson's Turbine.

Wm. N. Jeffers, Inspector of Ordnance, in charge, says:—"After a sufficient trial I have to report that it is in every respect satisfactory, and performs all the work for which it was calculated. As a considerable portion of the power is required to drive the circular saw, which is intermittent in its action. I have found it convenient to apply a governor in order to keep up a uniform speed when all the lathes are not in action."

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:—

Improved Press.—This invention consists in a press box, one side of which is made movable, so that the size of this box can be increased or decreased at pleasure. The movable side is fitted in suitable grooves, and it connects by ropes or chains with a windlass, in such a manner that by turning said windlass in one direction, the movable side is thrown open, and by turning it in the opposite direction, said side is closed up, and by the peculiar arrangement of the windlass and rollers, the chains are always kept taut. The follower is operated by two levers or lifters, the inner ends of which are hinged to the follower and connected by ropes or chains which extend over pulleys secured to the frame and thence down and under pulleys near the inner ends and over pulleys in the outer ends of said levers, and to a windlass or windlasses, in such a manner that, by the action of those branches of the ropes or chains, extending from the inner ends of the levers over the pulleys secured to the frame of the press, said levers are started from a horizontal position without requiring any attention from the operator. In order to take up the extra amount of chain, without embarrassing the operation of the press, the chains used for operating the levers and the follower extend over two drums, which are geared together, so that they rotate in opposite directions, and that the length of chain required to give the press sufficient power to do the work, can be taken up without difficulty. S. J. Austin, Freeport, Me., is the inventor.

Tobacco Paper.—This invention consists in coating or preparing thin sheets of fibrous material on one or both surfaces with fine particles of tobacco, thereby utilizing tobacco which is generally abandoned as "waste," or unfit for use, and thereby employing it for use in smoking after the manner of leaf tobacco.—H. J. Hale. No. 16 Beekman street, New York, is the inventor.

Improved Picker.—This invention consists in binding the wooden picker-cylinder of pickers for disintegrating fibrous materials by means of a strand or strands of wire or other equivalent means, so as to strengthen them, and make it possible to run them with safety at a greater speed than has been hitherto possible. Seth Boyden, Newark, N. J., is the inventor.

Carbureting Air.—This invention consists, principally, in carbureting air by confining or catching the carbonaceous matter which rises in the form of vapor from the hydro-carbon liquid during the natural process of evaporation. Mr. McAvoy's discovery obviates the necessity, heretofore existing, of employing the expensive and complicated apparatus which is commonly used to commingle the oil and air by forcing the latter through the former. Hugh L. McAvoy, of Baltimore, Md., is the inventor.

Canadian Patent Laws.

Hon. Mr. Perrault has introduced into the Legislative Assembly of Canada a bill to amend the Patent Laws so as to allow inventors of all other countries the privilege to take out patents in those Provinces. The bill, a copy of which is now before us, is quite liberal in its provisions, and we trust that it may become a law. When this is done, Canadians can take out patents here upon the same terms as citizens.

THE *Evening Post*, in a recent notice of Munn & Co.'s Patent Agency, says:—"These gentlemen are publishers of the SCIENTIFIC AMERICAN, in this city, and have had long experience in procuring patents for this and other countries. They possess unusual facilities, through their favorable connections in Washington, for securing patents without unnecessary delay, and, through their paper, for bringing the patents to public notice.

REGNAULT has in press a new work on vapors. This ought to settle all questions in relation to the heory at least of expansion.

SPECIAL NOTICES.

MILO PECK, of New Haven, Conn., has petitioned for the extension of a patent granted to him on the 25th day of November, 1851, for an improvement in drop presses.

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.

J. C. DICKEY, of Saratoga Springs, N. Y., has petitioned for the extension of a patent granted to him on the 3d day of June, 1851, for an improvement in revolving frames for drying fruits and other articles.

Parties wishing to oppose the above extension must appear and show cause on the 15th day of May next, at 12 o'clock, M., when the petition will be heard.

RICHARD E. SCHROEDER, of Rochester, N. Y., has petitioned for the extension of a patent granted to him on the 6th day of May, 1851, for an improvement in limekilns.

HENRY B. GOODYEAR, of New Haven, Conn., administrator of the estate of Nelson Goodyear, deceased, has petitioned for the extension of a patent granted to the said Nelson Goodyear on the 6th day of May, 1851, and re-issued, No. 556, on the 18th day of May, 1858, for an improvement in the manufacture of india-rubber.

HENRY B. GOODYEAR, of New Haven, Conn., administrator of the estate of Nelson Goodyear, deceased, has petitioned for the extension of a patent granted to the said Nelson Goodyear on the 6th day of May, 1851, and re-issued, No. 557, on the 18th day of May, 1858, for an improvement in the manufacture of india-rubber.

Parties wishing to oppose the above extensions must appear and show cause on the 17th day of April, at 12 o'clock, M., when the petitions will be heard.

A CURIOUS trial took place in Paris this week on a vexed horticultural question. It was decided that cauliflowers are not simple cabbages. This point was determined in a case of a "Railway Company v. Importers of Salad." The plaintiffs pleaded that by reason of its head a cauliflower required especial care *in transitu*. The defendants set it up as a mere cabbage, treating the head as an accident requiring no special service. If the head was broken, the pieces could be picked up and rendered serviceable. The Court, however, held that your cauliflower was a delicate plant, and ruled that it was entitled to be placed with peas, and therefore a verdict was given in favor of the carriers.

BUTTER.—The amount of the butter crop of the United States is estimated at $65,000,000. The value of this article might be greatly enhanced by stricter attention to its manufacture. No product of the farm is so liable to depreciation as this.

It is said that at the present time, scarcely one firkin in four opens perfectly sweet. This deterioration arises not from any real chemical or practical difficulty, but solely from want of knowledge or want of care in making it.

NUMBER OF FIRE ENGINES IN NEW YORK CITY.—At a recent examination of the Chief Engineer of the Fire Department, in this city, it appeared that there are 125 engine, truck and hose carriages, some 30 tenders to engines, and a number of "crabs" or "jumpers," for use in bad weather. The Chief Engineer testified that the ordinary speed of the steam engines drawn by hand, on the Broadway pavement, was 7½ miles per hour.

A French proprietor lately paid four millions of francs for a track of vine-land where Medoc was the favorite wine; and he has realized the full amount of the purchase money from the crop of 1864 alone. This result would almost satisfy an unsuccessful petroleum speculator.

IT was in 1846 that Faraday made the great discovery that all bodies are subject to the force of magnetism, some being drawn into positions parallel with the magnet, and others at right angles.

STEROXYLIN is the name of a substitute for glue used by paper manufacturers. It is said to be only soluble glass in a very concentrated condition.

COUNT RUMFORD'S DISCOVER THAT HEAT IS MOTION.

Now that the mechanical theory of heat is being generally accepted by philosophers as an established truth of science, it is peculiarly interesting to recall the manner in which the idea was first suggested to the mind of our countryman, Count Rumford.

"It is described in a paper published in the transactions of the Royal Society for 1798. He was led to it while superintending the operations of the Munich arsenal, by observing the large amount of heat generated in boring brass cannon. Reflecting upon this, he proposed to himself the following questions:—'Whence comes the heat produced in the mechanical operations above mentioned?' 'Is it furnished by the metallic chips which are separated from the metal?'

"The common hypothesis affirmed that the heat produced had been latent in the metal, and had been forced out by *condensation* of the chips. But if this were the case the capacity for heat of the parts of metal so reduced to chips ought only to be changed, but the change undergone by them should be sufficiently great to account for *all* the heat produced. With a fine saw Rumford then cut away slices of unheated metal, and found that they had *exactly the same capacity for heat as the metallic chips.* No change in this respect had occurred, and it was thus conclusively proved that the heat generated could not have been held latent in the chips. Having settled this preliminary point, Rumford proceeds to his principal experiments.

"With the intuition of the true investigator, he remarks that 'very interesting philosophical experiments may often be made, almost without trouble or expense, by means of machinery contrived for mere mechanical purposes of the arts and manufactures.' Accordingly he mounted a metallic cylinder weighing 113.13 pounds avoirdupois, in a horizontal position. At one end there was a cavity three and a half inches in diameter, and into this was introduced a borer, a flat piece of hardened steel, four inches long, 0.63 inches thick, and nearly as wide as the cavity, the area of contact of the borer with the cylinder being two and a half inches. To measure the heat developed, a small round hole was bored in the cylinder near the bottom of the cavity, for the insertion of a small mercurial thermometer. The borer was pressed against the base of the cavity, with a force of 10,000 pounds, and the cylinder made to revolve by horse power at the rate of thirty-two times per minute. At the beginning of the experiment the temperature of the air in the shade and also in the cylinder was 60° F., at the end of thirty minutes, and after the cylinder had made 960 revolutions the temperature was found to be 130° F.

"Having taken away the borer, he found that 839 grains of metallic dust had been cut away. 'Is it possible,' he exclaims, 'that the very considerable quantity of heat produced in this experiment—a quantity which actually raised the temperature of upward of 113 pounds of gun metal at least 70°, could have been furnished by so inconsiderable a quantity of metallic dust, and this merely in consequence of a change in the capacity for heat?'

"To measure more precisely the heat produced, he next surrounded his cylinder by an oblong wooden box in such a manner that it could turn water-tight In the center of the box, while the borer was pressed against the bottom. The box was filled with water until the entire cylinder was covered, and the apparatus was set in action. The temperature of the water on commencing was 60°. He remarks, 'The result of this beautiful experiment was very striking, and the pleasure it afforded amply repaid me for all the trouble I had taken in contriving and arranging the complicated machinery used in making it. The cylinder had been in motion but a short time when I perceived, by putting my hand into the water and touching the outside of the cylinder, that heat was generated.'

"As the work continued the temperature gradually rose; at two hours and twenty minutes from the beginning of the operation, the water was at 200°, and in ten minutes more it actually boiled! Upon this result Rumford observes, 'It would be difficult to describe the surprise and astonishment expressed in the countenance of the bystanders, on seeing so large a quantity of water heated and actually made to boil without any fire. Though there was nothing that could be considered very surprising in this matter, yet I acknowledge fairly that it afforded me a degree of childish pleasure which, were I ambitious of the reputation of a grave philosopher, I ought most certainly rather to hide than to discover.'

"Rumford estimated the total heat generated as sufficient to raise 26.58 pounds of ice-cold water 180° or to its boiling point; and he adds, 'from the results of these computations, it appears that the quantity of heat produced equally or in a continuous stream, if I may use the expression, by the friction of the blunt steel borer against the bottom of the hollow metallic cylinder, was *greater* than that produced in the combustion of nine wax candles, each three-quarters of an inch in diameter, all burning together with clear, bright flames.'

"One horse would have been equal to the work performed, though two were actually employed. Heat may thus be produced merely by the strength of a horse, and in a case of necessity this might be used in cooking victuals. But no circumstances could be imagined in which this method of producing heat could be advantageous, for more heat might be obtained by using the fodder necessary for the support of the horse, as fuel.

"By meditating on the results of all these experiments, we are naturally brought to that great question which has so often been the subject of speculation among philosophers, namely, What is heat? Is there such a thing as an igneous fluid? Is there any thing that with propriety can be called caloric?

"We have seen that a very considerable quantity of heat may be excited by the friction of two metallic surfaces, and given off in a constant stream or flux *in all directions*, without interruption or intermission, and without any signs of *diminution* or *exhaustion*. In reasoning on this subject we must not forget *that most remarkable circumstance*, that the source of the heat generated by friction in these experiments appeared evidently to be *inexhaustible*. (The italics are Rumford's.) It is hardly necessary to add, that any thing which any *insulated* body or system of bodies can continue to furnish *without limitation*, cannot possibly be a *material substance*, and it appears to me to be extremely difficult, if not quite impossible, to form any distinct idea of anything capable of being excited and communicated in those experiments, except it be MOTION."

REMARKS ON THE SUBJECT OF FORCE IN GENERAL.

BY JOHN A. ROEBLING.

[For the Scientific American.]

The subject of Force is now engrossing the attention of scientific men. In the early part of this century the conclusion was arrived at from general reasoning, that all forces in nature spring from one common source, and that correlations exist between the various phenomena which accompany the evolutions of nature's display. Since the year 1842, the publications and experiments of Mayer, Joule, Grove and others have thrown a flood of light upon the nature of force, and the earliest enunciations of the philosophical spirit of this century bid fair to be fulfilled to the letter. The most important truths which may be deduced from the facts but recently demonstrated experimentally, may be stated in general terms as follows:—

1. Force is matter in motion.

2. Matter is an incorporation of force, consequently also of motion.

3. The quantity or mass of matter which constitutes our Earth and atmosphere, is a fixed, invariable quantity. So is the aggregate mass which composes our planetary system. The same is true of each planetary system, and equally true of the whole material Universe. This broad statement may be objected to on the ground that new comets are being formed, that old ones are growing larger, and that meteors are being constantly made and dissolved within our cosmic region and outside of it. The answer is that all these processes take place *within* the realm of material creation and not *outside* of it. If a new comet is formed, it is out of that cosmical matter which constitutes the material universe. And if a comet becomes extinct, its nucleus by that process is simply resolving itself (from some unknown cause) into the original elements of space. The great fact impresses itself upon the human mind that the material creation is a fixed, and, for the time being (but not eternally), an unalterable quantity.

4. The material composing the universe being a constant quantity, and matter being equivalent to force, it follows that the forces of nature, in the aggregate, also form a constant and invariable quantity.

5. From the foregoing, it is evident that no additional forces, no new forces, can be created; neither can the general storehouse of forces, or of matter, be diminished.

6. There is neither creation, in the common sense, nor annihilation, and never has been. There certainly was a beginning, because processes cannot be *eternal* in duration, but they may last an *infinite* period of time. The word *Beginning* must be understood in an ideal or heuristic sense. All material existence constitutes a material process; all processes are governed by an inner unseen cause, and this cause, when traced to its final cause, will be discovered to be totally independent of time and space. To further elucidate this proposition would be out of place in this essay.

7. Since natural existence is only a process, in which a certain invariable quantity of matter or force is employed by the Creator for a certain well defined and well understood purpose, viz: the evolution and growth of rational and sentient beings—the conclusion logically presents itself that all changes and phenomena which are observed in nature are only phases of this process, passing away more or less rapidly. Whether this process involves the gradual evolution of elementary matter out of a chaotic condition, consuming millions of ages for its accomplishment, or whether it is a perpetual, never-ceasing action, as, for instance, the evolution of light and heat by the sun, and the consequent enormous evaporation of the ocean, and accompanying generation of electric and magnetic forces—it makes no difference, because time in the economy of nature is of no account.

8. All phenomena are more or less remote effects of the universal process; on this earth, as well as in our whole planetary system, and equally so in the whole realm of creation. The creative process, which maintains the life of the universe at large, is progressing uninterruptedly, without cessation. To arrest this vast process one single second of time would be annihilation. The pulsation of Universal Causality, which supports the life of the whole, is vibrating through every part, and in perfect accord and unison with that Great Central Mind and Heart which is the final cause of all.

9. Light being the most subtle and also the most universal force known and observed in nature, it may be inferred *a priori* that all other planetary forces either have grown out of it or refer to it, being more or less governed by it. The facts discovered of late years appear to favor the truth of this inference; but long years may pass away before it may become a scientific and experimental demonstration.

10. Heat is a less subtle agency, and admits of more tangible and conclusive experiments. Heat is a centroperipheric force, acting spirally, either expanding or contracting matter in its endeavors to equilibrate with the surrounding temperature.

11. It was stated that *force* is *matter in motion*, and that matter is incorporated force or motion. So long as two contiguous particles or molecules of the same kind of matter are in a quiescent state, or in equilibrium in a dynamical sense, so long will they both remain at rest with reference to each other. But should the thermal, electrical, magnetical, or chemical condition of the one molecule be disturbed, then the equilibrium will cease, and a display of force will result, which display is simply an endeavor to restore the lost equilibrium. If one molecule is set in motion, its condition opposite the other molecule is changed, and the consequence will be that this neighboring molecule is affected in the same way. And so the disturbance will proceed from one molecule to the other, until the whole mass is *uniformly* affected either by heat, electricity, or other kind of energy.

12. In the above phenomena no new evolution of

force, no new creation, takes place; only a communication of disturbed condition from one molecule to another is transpiring, and this process continues until an equilibrium between all the molecules is obtained. All particles of matter are subject to natural affections, or to the energies which nature employs in her processes. The single molecules will remain at rest toward each other so long as they are equally affected or in an equally sensitive condition. But as soon as their affections differ in degree, then a more or less violent endeavor takes place to restore their former equality. The principles of nature are essentially democratic and founded on even justice.

13. All exhibitions of force result from a disturbance of equilibrium. This is equally true in a cosmical as it is in a terrestrial sense. The equilibrium of the universe is preserved by the constant tendency of gravitation to correct regular and irregular perturbations, and thus to maintain, not the equilibrium which attends rest, but which is the result of well-balanced motion. Nature knows no absolute rest—motion is universal. Where rest appears, it is only comparative. The motion of our planet and its life is supported by the light of the sun, which is a never-failing source of energy. Without the sun's influence, the play of all other energies would cease—stagnation and death would result. Owing to that constant flow of energy which is poured upon the planets by the central luminary, their molecular equilibrium is kept uninterruptedly disturbed. Not only is the earth's individual rotation maintained, but it is driven around the luminar center of gravitation, thereby proving that its center of life is not within itself, but outside of it. And by the same energy all minor planetary processes are sustained, more or less remotely, because they are all effects of the central cause.

14. The sun, by virtue of its greater mass, is positive opposite the planet, which, as the lesser quantity, is negative. And since matter is equivalent to force, the sun represents an overwhelming energy compared to the planetary energies. This immense difference constitutes a never-failing source of disturbance to planetary rest. In their mutual endeavor to restore rest and equilibrium, the sun is kept revolving around itself, and the planets are driven on in their swift race; and since equilibrium of rest can never be restored, an equilibrium of endless motion is the result.

15. Force is matter in motion. Mechanical motion proceeds from an outer cause, and is only communicated outwardly—that is, mechanically. If an iron ball is set in motion by powder, that motion is simply communicated or imparted by the expansive force of the gases which have been dynamically evolved by the process of combustion. That dynamical process was initiated by a match or by friction or percussion. The powder explosion takes place because of the disturbed equilibrium of the particles of powder. In a steam engine the elastic power of steam acts upon the piston, and its motion is communicated to various kinds of machinery. The dynamical motion is converted into mechanical motion, and the latter again expends itself in friction, and friction again produces heat and electricity. It does not matter how a force is produced or started, none can ever be lost. When a force is expended apparently, it has only been communicated to some neighboring matter, or has been converted into some other mode of motion. Nor can a new force be produced by any process whatever. When a weight falls ten feet, it has thereby produced a certain amount of mechanical action. But to restore the previous condition of things, the weight has to be raised again to the point of starting, and the same amount of force is expended. When steam is raised as a motive power, it is done through the agency of heat. But heat is the result of a chemical process by which no atom is destroyed; only old combinations are destroyed and new ones are formed. Now this process of combustion is attended by the phenomena of heat, and this heat is converted into mechanical action, and at last back again into heat and electricity. The heat which raised the steam was evolved by that oxydizing process in which carbon and oxygen unite and form carbonic acid. The principle of heat manifests itself through the vehicle of matter, its combinations and decompositions. The principle is universal and invariable. Matter is subject to certain mathematical evolutions, governed by certain laws on mathematical formulas, and these formulas have materialized and expressed themselves in certain fixed motions or modes of action, and these modes are known as heat, light, electricity, magnetism, etc. Now since these material actions of well-defined mathematical principles can only take place by means of matter which is constituted accordingly, and to suit the action, or whose consolidation is fixed by that very action of the spiritual or scientific principle, it follows as a matter of course that the quantity of existing forces is just as invariable as is matter itself.

[To be Continued.]

MR. MUSHET AND THE BESSEMER PROCESS.

Wrought iron is the pure metal, cast iron contains 2 to 4 per cent of carbon, and steel from $\frac{3}{4}$ to $1\frac{3}{4}$ per cent of carbon. Wrought iron is made by laboriously extracting the carbon from cast iron, and steel is made by restoring a portion of the carbon to wrought iron.

Bessemer's first plan was to remove just enough of the carbon from cast iron to leave it in the state of steel, and thus avoid the round about process of changing the metal first to wrought iron. It is well known that if carbon at a high temperature is brought into contact with free oxygen, the two elements combine to form either carbonic oxide or carbonic acid, and that both of these substances are gases. As one-fifth of the atmospheric air is free oxygen, Bessemer conceived the simple plan of blowing atmospheric air through molten cast iron, to burn out a portion of the carbon contained in the iron.

Mr. Bessemer, on trying his plan, found that it was exceedingly difficult to stop the combustion of the carbon at just the point to leave the metal in a state of steel, and the method now adopted is to continue the operation until the carbon is wholly consumed, and the molten cast iron is added to this wrought iron in such proportion that the mixture will contain the requisite quantity of carbon to form steel.

But there is difficulty in stopping even at the point where the carbon is all consumed. Oxygen has a very strong affinity for iron, especially when the iron is heated, and if on entering the mass it finds no carbon with which to combine, it enters into combination with the iron, forming oxide of iron. Oxide of iron is a brittle substance, and if it is scattered through a mass of iron it destroys the tenacity and value of the metal. It is manifest that the combination of oxygen with the iron is almost certain to commence before the whole of the carbon is consumed, as an atom of oxygen entering the molten mass might meet with an atom of iron before it encountered the last atom of carbon.

This fatal difficulty in the process was effectually overcome by a suggestion of Mr. Mushet, a suggestion which has made the Bessemer process a practical industry. The last number of the *London Engineer*, in a leading editorial on the subject, says:—

"Oxygen, in combining with carbon, produces a gaseous compound, only one-half heavier then air itself; and hence this compound must, of necessity, rise to the surface. But in combining with iron oxygen forms a heavy metallic compound, which is quite as likely to remain secreted in the pores of the melted mass as to float—for in no case can it escape into the air. That this compound is not formed from the first application of the blast is more than probable, because when, by a lucky hit decarburization has been stopped at the right point for steel, the product is much less red short than when the process is continued until all the carbon is exhausted. But however this may be, the danger of burning the iron before it is fully converted remains as distinctly as ever. Mr. Mushet saw it with the eye of a practised metallurgist, and almost as soon as he could have known of Mr. Bessemer's discovery, to wit, in September, 1856, he patented the remedy. His reasoning was rapid and conclusive. There was the oxygen secreted in the iron, and it must be got out. How? By presenting to it a metal more oxidizable than iron—a metal whose own affinity for oxygen would de-oxydize the iron. Such a metal is manganese; and the best vehicle for manganese, in this case, is spathic iron, or spiegeleisen. The best proof of the value of this addition is the fact that it was only after it was made that Bessemer metal took a recognized position in the market.

"Strangely enough, a discovery at once so important has brought no rewards to its author. Mr. Mushet's affairs were in the hands of trustees, and in 1859, three years after the reading of Mr. Bessemer's memorable paper at the Cheltenham meeting of the British Association, his process was looked upon as so hopelessly worthless that his trustees would not pay the £50 stamp to keep alive the patent for a discovery upon which the present value of the Bessemer process mainly depends. So it lapsed, and Mr. Bessemer lost no time in turning his opportunity to account, and how well he has done so is proved by the fact, which he takes no pains to conceal, that his present income from royalties exceeds £100,000 per annum! His royalties are £1 per ton for ingots for rails, £2 a ton for ingots for axles, &c., and £3 per ton for ingots for a higher quality of steel; and these are strictly enforced against the largest concerns in the land. Even the London and North-Western Railway Company obtain no discount, and if the Ebbw Vale Company have done so it has been in the form of a sale of Martien's curious patent to Mr. Bessemer for £30,000—Martien having parted with it for £500."

Mechanical Progress.

Under this head the Hartford *Daily Post* pays the following compliment to the Scientific American:—

"We cannot do a greater service to machinists than to call their attention to a series of illustrated articles on 'Turning Tools' just published in the Scientific American. They are evidently from the pen of a practical workman, and are invaluable, not only for the accurate illustration, but for truly practical suggestions they contain. Probably on no one thing are machinists so disagreeing as on the proper shape of turning tools, and the proper use to which the varying kinds are applied. Some seldom use a 'bossing' or 'diamond point,' roughing off the work with a 'side tool.' It is an expensive and awkward use of a tool intended and adapted mainly to 'squaring up.' But in grinding tools the master mechanic submits to many annoyances in consequence of the shiftless habit of men who satisfy themselves with touching the point or cutting edge alone upon the stone. By a little care and time spent in properly grinding a tool, much labor is saved the forger, and a tool can be used up to the stock and still kept in shape without once dressing if managed with some degree of care and intelligence. A 'side tool' after being once finished should never be ground on the vertical cutting face. The top and edges alone should be ground and the latter more than the former. Many workmen grind the cutting point of a diamond tool until the back angles are much the highest and then the tool 'gnaws' the work instead of cutting it. A slight rounding of the cutting angle or face of the 'diamond point' will ensure smoother work and retain the edge much longer than where the corner is left a perfect angle. In finishing a shaft for a fit, or for a bearing, the slovenly habit of using the file ought to be entirely abandoned. A water polish with a 'square nosed' tool insures perfect rotundity and gives a better surface than the file and emery can. No more should be removed by this finishing cut than will just obliterate the marks of the bossing tool and leave a good surface. In the article referred to in the Scientific American the writer approves of the use of 'swan neck or spring tools.' We think their use of doubtful utility. No dependence can be placed upon securing perfect roundness or truth unless the material turned is perfectly homogeneous, a condition which the best iron, and even steel, will rarely fulfill. Instead of allowing for springiness in either the work or the tool, we believe that absolute stiffness and rigidity are indispensable to making a good job. Another bad habit among careless workmen is the use of turning tools indiscriminately on the lathe and the planer. While turning tools must have considerable 'rake,' the planer tools are forged nearly at right angles with the stock."

[By referring to page 34, current volume of the Scientific American, our readers will see precisely what we said about the use of spring tools.—Eds.

The King of Siam, whose full name is "Phra Bart Somdetch Phra Paramenpe Maha Monghui Phra Chaum Kiow Chow Yu Hua," recently celebrated his sixtieth birthday, the ceremonies being of the most gorgeous character.

Correspondence

Dental Plates.

Messrs. Editors:—You will confer a favor on the public if you will say what description of dental plate—sets of teeth—is most durable and least injurious to health.

I have used teeth set in gold for several years, and the set for the lower jaw was covered with tin to make it heavy. The plate for the upper jaw broke several times, but was mended again, but I am afraid with an impure metal, judging from the galvanic action in the mouth from which I suffer so constantly.

My health has been giving way for many months past, and recently an idea has possessed me that the cause is the slow imbibing of a metallic poison. Will you enlighten me a little on this subject?

American Telegraph Co., Jan. 25, 1865. S. H.

[The salts of all metals, with the single exception of iron, we believe, are poisonous, and all metallic poisons have the insidious property of accumulating in the system. If two metals are placed in contact, the effect is to protect the less oxidizable metal completely from rust, and to increase the action upon the other. We should suppose that dental plates ought to be made of a single metal, and one having but slight affinity for oxygen—the best being gold.—Eds.

Paper from Cane, Hemp Stalks, Wood, Etc.

Messrs. Editors:—In your issue of January 28, 1865, a letter from Mr. F. H. Sellers is published which contains some statements in relation to the disintegrating process by which Mr. Lyman obtained a patent some years ago. Mr. Sellers says that he and his father having obtained a license to use the Lyman process tried it upon cane in July, 1863, at Seller's Landing, in Hardin County, Ill., found it dangerous and costly, and that "the disintegration was not into ultimate fibers, but into long bundles of fibers, which, to separate, had to be treated with caustic alkali, under pressure, precisely as straw is treated, and then again blown through a small opening by steam power."

Mr. Sellers does not mention the fact that the license which his father obtained to use Lyman's process was dated April 12, 1862, and required him to have the guns in full operation within nine months from that date; and that he having failed to fulfill that condition received notice in February, 1863, that the license was forfeited, and that he would be sued as an intringer if he used the process.

Mr. Sellers, in his published letter before referred to, says that he did not use the process after that date, viz: in July, 1863, and was quite dissatisfied with it. Be that as it may, it is very certain that he could not use the guns if he had desired to do so. The Fiber Disintegrating Company, having become the owners of Lyman's patent, purchased from Mr. Sellers the two guns which he set up upon his farm in Illinois, and have lately ordered them to be removed to the works of the company, in the vicinity of St. Louis, where they intend to prepare cane, flax and hemp stalks for paper stock and textile material. Mr. Sellers, it appears, intends to prepare cane for paper stock by some process of his own, and has availed himself of your columns to show the superiority of his invention. It seems to be very probable that the use of the guns was dangerous to his farm hands; but, the fact is, that there is no danger in the use of them as they are now constructed when in the hands of competent persons. They are constructed to bear a pressure of over 1,000 pounds to the inch, whereas the pressure used is less than 200. They are supplied with steam from the Harrison or Bulb boiler, which is safe at 1,000 pounds pressure. What boilers Mr. Sellers had upon his farm I cannot say, but it is certain that he had no boilers of this construction. With respect to the cost of working the guns, and their capacity, I would observe that four guns of fifteen inches diameter, which have within the last few days been sent to the company's works, at St. Louis, have capacity sufficient to disintegrate over fifty tuns a day, at a cost of less than $2 a tun. It is true that "the disintegration is not into ultimate fibers, but into long bundles of fibers;" but then these long bundles of fibers are much more easily treated with chemicals than the raw cane could be. When they are boiled an hour or less in an open vessel, in a weak chemical solution, and then washed, they become good pulp. But Mr. Sellers tells us that by "a system of sap volatilization" he dispenses with the use of chemicals, and is able to produce what you call "a very fine article of wrapping paper" from three-fifths cane and two-fifths of some other material. What that "other material" is, is not stated. By the Lyman process a very fine white printing paper is produced from the cane alone, but not without the use of chemicals. Great improvements have been made in the construction and use of the guns and in the process subsequent to the blowing, and very large works have been erected during the past year in Brooklyn, where the company expect to make at least twenty tuns of paper pulp daily. The blowing process will also be applied in the West to tangled unretted flax straw and to green hemp stalks to produce textile material.

Wm. P. Arnold,
Secretary of the Fiber Disintegrating Company, No. 29 Broadway, N. Y.—January 30, 1865.

Careless Handling of Fire-arms.

Messrs. Editors:—Since the St. Alban's raid several persons in this vicinity have procured revolvers, and several serious accidents have occurred from the imprudent use of them—generally by persons foolishly pointing them at others, not thinking they were loaded. Now my opinion is that a person who will point a pistol at another, whether it is loaded or not—yes, a person that will even point a broom-handle, in imitation of a rifle, at any one—is not only a good candidate for an asylum of idiots, but is deserving of rough horse-whipping. I would like very much to have your opinion given in the columns of the widely circulated Scientific American.

Bristol, Vt., Feb. 3, 1865. E. G. P.

[One of our playmates once pointed a gun directly at the head of his younger brother, and pulled the trigger, supposing of course that the gun was unloaded. It was in the old days of flint locks, and as he turned back the hammer, to his horror he saw that the pan was filled with powder. On trying the gun again at a robin, it was discharged, and the bird fell dead at his feet. The first time the gun accidentally missed fire, and by this chance only was he spared from blowing his brother's head to pieces. We believe that by far the largest portion of accidents with firearms occur from handling them carelessly when they are supposed to be unloaded.—Eds.

Pyroligneous Acid in Chimneys.

Messrs. Editors:—Our stove stands twelve feet from the chimney, which is twenty-five feet high; flue 4 inches by 12 inches, open top. Moisture condenses and runs down the chimney. If you know any remedy other than placing the stove nearer the chimney, will you be kind enough to indicate it? Stewart stove and dry wood are used.

Racine, Wis., Jan. 26, 1865. D. W. E.

[This moisture is doubtless pyroligneous acid and water. If the action continue long enough, our correspondent will find that the acid will dissolve the lime in the mortar, and the bricks in his chimney will be as loose as if they were laid in dry sand. His stovepipe will also be corroded. We know of no remedy.—Eds.

The Two Wheels.

Messrs Editors:—In answer to "A Mechanical Problem," in a late number of your paper, I would say that the statement of the question is incorrect.

Two wheels composed of materials of different specific gravities cannot have "precisely the same size, weight and form," and at the same time have the materials differently disposed with relation to each other. If the iron at the rim of the one be placed at the center of the other the two wheels may have the same weight and form but not the same size—or the same weight and size but not the same form. The problem is fallacious. J. J. Dunlap.

Springfield, Ohio, Feb. 9, 1865.

[Suppose you make two wooden wheels weighing one pound each, and of the same size and form; then turn a groove in the periphery of one, just large enough to take a ring of iron weighing one fourth of a pound, and bore a hole in the center of the other of just the size to receive a cylinder of iron weighing one fourth of a pound?—Eds.

Drilling and Turning Glass.

Glass may be readily drilled by using a steel drill, hardened but not drawn at all, wet with spirits of turpentine. Run the drill fast and feed light. Grind the drill with a long point, and plenty of clearance, and no difficulty will be experienced. The operation will be more speedy if the turpentine be saturated with camphor gum. With a hard tool thus lubricated glass can be drilled with small holes, say up to three-sixteenths, about as rapidly as cast steel. A breast or row drill may be used, care being taken to hold the stock steady, so as not to break the drill. To file glass, take a 12 inch mill file, single cut, and wet it with the above mentioned solution, turpentine saturated with camphor, and the work can be shaped as easily, and almost as fast as if the material were brass.

To turn glass in a lathe, put a file in the tool stock and wet with turpentine and camphor as before. To square up glass tubes, put them on a hard wood mandrel, made by driving an iron rod with centers through a block of cherry, chestnut or soft maple, and use the flat of a single cut file in the tool post, wet as before. Run slow. Large holes may be rapidly cut by a tube-shaped steel tool, cut like a file on the angular surface, or with fine teeth after the manner of a rose-bit—great care being necessary, of course, to back up the glass fairly with lead plates or otherwise to prevent breakage from unequal pressure. This tool does not require an extremely fast motion. Lubricate as before. Neat jobs of boring and fitting in glass may be made by these simple means. I have endeavored to turn glass rods with diamond pointed steel tools, etc., but without success. The whole secret lies in good high steel, worked low, tempered high, and wet with turpentine standing on gum camphor.

Baron Liebig's "Soup for Children."

With that remarkable estimation of the greatness of small things which is the most valuable of his many high intellectual qualities, and with a tender appreciation of the importance of small people, Baron Liebig devotes a special article in an English scientific periodical to the description of a new diet which he conceives to be the most fitting substitute for the natural nutriment of children robbed of their mother's milk. It is well known the cow's milk does not adequately represent the milk of a healthy woman, and when wheaten flour is added, as it commonly is, Liebig points out that, although that starch be not unfitting for the nourishment of infants, the change of it into sugar in the stomach during digestion imposes an unnecessary labour on the organization, which will be spared it if the starch be changed into the soluble forms of sugar and dextrine. This he effects by adding to the wheaten flour a certain quantity of malt. As wheaten flour and malt flour contain less alkali than woman's milk he supplies this when preparing the soup. This soup may be shortly prepared, as follows:—"Halt an ounce of wheaten flour and an equal quantity of malt flour; seven grains and a quarter of bicarbonate of potash and one ounce of water are to be well mixed; five ounces of cow's milk are then to be added, and the whole put on a gentle fire; when the mixture begins to thicken it is removed from the fire, stirred during five minutes, heated and stirred again till it becomes fluid, and finally made to boil. After the separation of the bran by a sieve it is ready for use. By boiling it for a few minutes it loses all taste of the flour." The immediate inducement for Baron Liebig making this soup arose from the fact that one of his grandchildren could not be suckled by its mother, and that another required, besides his mother's milk, a more concentrated food. The soup proved an excellent food—the children thrived on it. Baron Liebig has himself used this soup with tea as a breakfast, and a most thoroughly nutritious meal it must be.

From the experiments of Regnault, it appears that the sum of the latent and sensible heat of steam increases with the temperature by a constant difference of 0·305 for each degree Fahrenheit.

The Bursting of the Parrott Guns---Report of the Naval Committee.

The *Army and Navy Journal* contains the elaborate report of the naval committee appointed to consider and report on the subject of rifle cannon for the navy. The report is dated Washington. January 18, 1865. The committee find that seven hundred and three Parrott guns of all calibers have been issued to the naval service, and that of these twenty-one have burst or been otherwise injured by explosion. Several of the injuries have appeared in fracture or rents, enabling the withdrawal of the guns form service in time to avoid casualties, and many of them have occurred in the chase or at the muzzle, and not, as is customary with other guns, at the breech; thus affording evidence that they arose from the premature explosion of shells within the guns—a fact which is proved by the direct testimony of several officers in charge at the time. That these guns have in some instances been injured by other causes than the premature explosions of shells, such as the use of compressed powder, projectiles deemed by Mr Parrott unsuitable for guns of his construction, by keeping guns loaded for a great length of time, and also by the neglect in heat of battle to lubricate the projectiles as required by the ordnance instructions—a most necessary and important precaution, having for its object not only the free movement of the projectile, put particularly as a means of neutralizing the tenacious deposit from the powder—which is admitted in some cases to have been done there seems little doubt; but they are exceptional cases. The committee, however, recommend that as the premature explosion of shells is one, and, in their opinion, the principal cause of the failure of the Parrott guns, experiments should be conducted at Cold Spring, or elsewhere, to place the question of this cause of bursting beyond dispute, and to decide whether it may be abated or not. With this view, the committee give directions as to the manner in which the experiments should be conducted. The result of these experiments will decide the question of retaining in the service, or rejecting, the Parrott guns. Pending this decision, they recommend to the Bureau of Ordnance that a circular be issued, directing certain reductions of the charge of one hundred pounders, and other precautionary measures to be taken. In consideration of the endurance exhibited by the Parrot rifle guns in proof and in service the committee deem it proper to state that in their opinion, the bureau was fully justified in adopting them for the naval service, as the best guns to be obtained to meet its immediate wants—various other systems of cast-iron rifled ordnance, having either failed or been withdrawn from service as unreliable. They therefore, in the belief that the guns of this description which have burst or failed may have been affected by one or more of the causes heretofore enumerated, especially the explosion of shells within them at the time of bursting, or previously, recommended the retention of all classes of those guns, except the 156-pounders, until the experiments herein recommended shall have been made. They also suggest the immediate withdrawal of such of the guns as may have been subjected to any one of the deteriorating causes arising from premature explosions and other causes, and that they be issued to vessels of the navy only as chase guns, not to exceed two for large and one for small vessels exclusive of rifled howitzers. The report, as published in the *Army and Navy Jour.*, is accompanied by voluminous appendices, with valuable tables, by the evidence of Mr. Parrott before the committee, and by a letter from the same gentleman, giving in detail his views as to the causes of the bursting of the guns. Commodores Missroon, Hitchcock, and Hunt, and Lieutenant Commanders Aulick and Jeffers, constituted the Committee.

Steam Fire Engines.

The Buffalo *Advertiser* says:—

Never was the value of our steam fire engines more fully demonstrated than during the recent conflagration. With no sinews to tire or muscles to grow stiff, they stood there, hour after hour, obedient to the fire-men and engineers, sending their never-ceasing streams upon the flames. Even the old "C. J. Wells," which was thought to have grown feeble and useless from age and hard service, was brought into requisition, and did honor to itself and its god-father. When it was feared that the machines might be disabled from freezing, rude coverings of carpets, old quilts, etc., were erected about them, giving them a decidedly unique appearance. Ever and anon the cheery sound of the steamers' whistles would be heard, as if hailing and encouraging each other amid the storm, and still they worked ceaselessly on.

The Artillery of the Future.

Mr. W. T. Carrington, Chairman of the Society of Engineers, England, made the following assertion on the occasion of his opening address :—

"The time will come when there will be no such thing as a rifled gun—all our guns will have perfectly smooth bores. Then we shall have guns of steel of the least weight combined with the necessary strength. If a smooth bore gun be rifled it is considerably reduced in strength; let the grooves be made as small as possible, still that gun is weakened. Take a cylinder, a beam, or anything that has to resist strains and groove them in a contrary direction to the direction of the strain, as in the case of a rifled gun, and you will find them far weaker and less able to bear the same strains than the cylinder or beam without the grooves, although of precisely the same weight. It is very easy to make a small groove in any beam, and reduce its strength by one half, although its weight is reduced but a fraction. Is it wise, therefore, to weaken the greater number of our guns by grooving them when we can have better results in one sense, from a smooth bore? 1st, there is a much stronger gun from the same weight of metal; 2nd, a less costly gun; 3rdly, a gun simpler and, therefore, more easily kept in order; 4thly, less strain on the gun from the same quantity of powder and same weight of shot; 5thly, greater velocity of the shot when leaving the gun. It can easily be shown that, with the same quantity of powder and weight of metal to be projected, the strain in a rifled gun is greater than in a smooth bore. We must admit that many guns would burst if the shot was so fixed in that it could not move by the force of the powder when exploded—one method to fix the shot would be to screw it in, the inclined plane of the screw being, say, 1 in 24, the gun would certainly burst before this screw slipped. What is a rifle but a screw? Although the inclined plane is very steep, it is a screw, and therefore requires some extra force to make the ball slide on the inclined planes, and this extra strain must of necessity be given to the gun by the same quantity of powder as used in the smooth bore for a greater velocity of the projectile with less strain. What I mean is this:—Possibly the ball or shot may yet be rifled—not the gun. If the rotary motion is given by the rifling of the gun, the ball has the greatest circular motion at the commencement of its flight, and the least at its termination, so that, independent of the objections to rifling the guns, the balls have their own reasons for being rifled themselves. If the money already spent on experiments on rifled guns had been employed in experiments on feathered or rifled balls, satisfactory results might have been obtained. It can only be decided by experiment which method of rifling or feathering the balls, will be best. Many schemes have been proposed. Spiral grooves might give sufficient rotary motion; if not, a short tail, having the necessary twist or screw, or two or more twisted faces on the nose of a shell or shot—which would be acted upon like the sails of a windmill to give rotary motion—or feathers imbedded in the side of the shot until leaving the gun, when they should be made to spring out and give the necessary surface for the atmosphere to give sufficient rotary motion."

[It has always been our opinion that if a rotary motion is to be imparted to the shot at all, it must be given during its passage out of the gun. It is very certain that if shot of any kind are to be made with spiral wings or feathers, they must be long shot and not balls.—EDS.

Magnesium Light for Dyers.

A dyer of Paris some months ago, saw the magnesium light for the first time, and discovering at once that its rays left colors unaffected, exclaimed "This is just what we have long wanted!" There are many days in winter when those who deal with delicate shades of color are utterly at a loss to discriminate between tint and tint, but the magnesium lamp will, it is thought, answer the purpose of sunlight.

THE RAILROAD UNDER BROADWAY.

We have before us a copy of a report made by A. P. Robinson, Civil Engineer, in relation to the contemplated railroad under Broadway and the Fifth avenue. It is proposed to construct a tunnel 25 feet 6 inches wide, and 16 feet high, under the middle of the street, with two railroad tracks, and with stations half a mile apart. At each station a building is to be erected on each side of the street, with one staircase to ascend and another to descend, under each building. The cars are to be each 40 feet long, besides sufficient space for a steam engine to drive it, and the number of the cars is to be equal to that of the stations, so that cars may start from all the stations at the same time. The cars are to start once in two minutes, and to occupy a minute and a half in running from one station to another. The estimated cost of the work at present prices is $8,487,000. Application for a charter is now pending before the State Legislature. The report concludes as follows:—

"I can conceive nothing so completely fulfilling, in every respect, the requirements of our population, as such a road with such an equipment, and worked in the manner suggested. There would be no dust. There would be no mud. Passengers would not be obliged to go into the middle of the street to take a car. They have simply to enter a station from the sidewalk and pass down a spacious and well-lighted staircase to a dry and roomy platform. The temperature would be cool in summer and warm in winter. There would be no delays from snow or ice. The cars would not be obliged to wait for a lazy or obstinate truckman. The passenger would be sure of a luxurious seat in a well-lighted car, and would be carried to his destination in one-third the time he could be carried by any other conveyance. These would be the advantages to those who ride, and for the other great public in the streets, there would be no collisions, no clashings, no broken wheels or fractured axles, no frightened horses or run over pedestrians. Everything would be out of sight and hearing, and nothing would indicate the great thoroughfare below.

Curious French Harness.

A French gentleman has patented a new invention for instantaneously releasing runaway horses from carriages. The driver, in case of accident, pulls a strap, by which the trace buckles are loosened and the horses run free with all the harness except the traces, which remain attached to the carriage.

[These Frenchmen always do things by halves. If a Yankee had conceived this idea there would have been an attachment to chase the horses, catch and secure them, and remonstrate with them on the impropriety of their conduct. EDS.

THE GOLDEN LILY OF JAPAN.—Several specimens of this rare and gorgeous exotic are on exhibition at the mechanic's fair, San Francisco. It is thus described: Imagine upon the end of a purple stem, no thicker then a ramrod and not above two feet high, a saucer-shaped flower at least ten inches in diameter, composed of six spreading and somewhat crisp parts, rolled back at their points, and having an ivory white skin, thickly strewn with purple points of studs, and oval or roundish prominent purple stains. To this add in the middle of each of the six yellow parts a broad stripe of light, satiny skin, and having the appearance of streamlets. From this delicious flower arises the perfume of orange blossoms sufficient to fill a large room, but so delicate as to respect the weakest nerves.

PRESERVATION OF IRON PLATES ON SEA-GOING VESSELS.—The French iron-clad frigate Invincible has just been taken into the dry dock at Castigneau, which has afforded an opportunity of judging of the efficacy of the system applied to that vessel for preserving her iron plates. A band of zinc, which by isolating the electric currents guarantees the plates from that green coating which causes injury, has transformed the nature of that vegetation, and, instead of a casing of marine herbs, there was found attached to the frigate's bottom a fine collection of corals.—*Galignani.*

[Corals must have changed their habits to grow on ships' bottoms. Should not the word be barnacles? —EDS.

Improved Revolving Hay Rake.

The rake herewith illustrated is of the ordinary kind, with a few exceptions. The operator rides instead of walking, and the load is discharged from the seat instead of by grasping the handles behind, as in the old style. The arrangement for transporting the rake to and fro is also different. The center of the head, A, which carries the teeth has a journal on which the whole rake revolves. There are two cams, B, on the shaft which the stop, C, buts against when at work, and holds the teeth in the proper position. By withdrawing this from the seat, the head rolls over and deposits the windrow with great regularity. There is a spring catch at D which prevents the rake from slipping backward when at work.



WARNER'S REVOLVING WHEEL RAKE.

The dotted lines show the position of the rake when folded up for moving from one field to another. By bearing on the handle at the side of the driver the rake can be elevated so as to clear obstacles of any nature. The proprietor says:—

"In offering his improved rake to the public he feels sure that he has the rake especially adapted to gathering hay, and one which will command the patronage of all hay growers after practical use.

"The labor of operating this rake consists in riding upon the cart, and resting the hand steadily upon the end of the lever. When it is to be revolved, bear a little upon the lever and at the same time spring the the latch with the thumb upon the side of the lever, and the rake revolves, when the latch flies back and catches the rake from revolving the second time. In passing over obstructions the operator elevates the forward ends of the teeth by lifting up the lever; the rake may then be driven over; or, by bearing down upon the lever, the rear end of the teeth are elevated, when the rake may be backed up if desired.

This rake may be used by old men or boys, in fact, any one who is old enough to manage a horse and handle the lever. Patented through the Scientific American Patent Agency, Nov. 15, 1864.

Rights to territory for sale in any part of the United States not sold, and in any quantity to suit customers. For any information address H. N. Tracy, Painsville, Vt.

ORDNANCE AND ARMOR.

D. Van Nostrand, of 192 Broadway, New York, has just published a treatise on Ordnance and Armor, by Alexander L. Holley, B. P., and we tender our thanks to the author for a copy of the work. It is a book of 900 pages, with 493 engravings, printed in fair type on good paper, and handsomely bound. It is filled from beginning to end with the most valuable and interesting facts pertaining to the subject of which it treats. We have not space even for an enumeration of its contents, but select a few of the subdivisions as samples. Under the head of Hooped Guns there is first a description of the Armstrong gun: giving details of fabrication, breech-loading, rifling, charges, proof, cost, and endurance. Then follow the same details in relation to the Whitworth gun, the Blakely gun, the Parrott gun, and other hooped guns. The next section is devoted to solid wrought-iron guns, and contains descriptions of the Horsfall, the Stockton, the Brooklyn Navy Yard 12 in., and many other wrought-iron guns, with the particulars of their fabrication, charges, and endurance. Heavy shot at low velocities is discussed under seven heads, with full accounts of the various experiments bearing on the subject that have been made in England and America. In the same detailed and thorough manner are treated the subjects of small shot at high velocities, "The two systems combined," "Breaching masonry," "Resistance to elastic pressure," "The effects of vibration," "The effects of heat," "Elasticity and ductility," and, in short, all departments of the subject. The author asserts that the reports of experiments are derived almost exclusively from records and drawings in Government offices, with the exception of those which are taken from the pages of the Scientific American.

From the talent shown in the collection and compilation of facts, it is safe to infer that the discussions are also able; we shall notice these more at length when we have given them further examination.

Fatal Accident From Oxygen.

In December last, a Mr. Crowther, at Manchester, England, while engaged in preparing oxygen gas for the Drummond or oxy-hydrogen light, was instantly killed in his own dwelling by the explosion of his retort. His son and wife were also badly wounded. Mr. Crowther had often before prepared the gas, and it appeared at the inquest, that the explosion was due to the adulteration of the manganese used, with soot or coal, and that when a small quantity of any such organic substance is present with chloride of potash a very explosive mixture is generated in the retort.

The practice of using oxygen gas for home pictures in the magic lantern has become quite common. We have never before heard of any serious injury resulting from its preparation, though we have more than once been cognizant of the unaccountable bursting of the elastic pipe which connects the retort and the wash bottle.

We believe that the magnesium light might be substituted for the oxy-hydrogen. The metal in the form of wire, for burning, is sold in London for 1½ cents a foot. At triple this price it would be as cheap as the oxy-hydrogen light for the majority of amateurs.

A good paste for fixing paper labels on tinned sheet iron may be obtained by preparing a paste from water, rye flour, and a small quantity of a solution of glue, to which add so much of Venice Terebinth as to fit it for brushing over the labels, which will adhere closely to the thinned surface and will not be affected by moisture.

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THE CAUSE OF BOILER EXPLOSIONS.

We have for years been endeavoring to impress engineers and manufacturers with the necessity of caution and care as preventives of boiler explosions. We have repeatedly expressed the opinion that these disasters were not the result of mystery or of the complicated theories so often brought forward to account for them. These views were expressed as the result of experience, not of easy-chair deliberations, and we have no reason to doubt the soundness of them. We are rather strengthened in them by the following paragraph, which we cut from the report of the Manchester (England) Boiler Association.

This institution has been in existence eleven years. It consists of practical and scientific men who examine each boiler enrolled upon their list. The charge for enrollment is one guinea and a half, and if repairs be necessary or inherent weakness detected the same is pointed out and the proprietor is free to get his work done where he pleases. If any boiler *explode*, that is the word, after such examination, the proprietor thereof is entitled to recover damages from the association to the amount of $1500. The report says:—

"Ten years' actual working of this system has established its general utility to the steam user, as well as its sufficiency for the prevention of steam boiler explosions, while the constant investigations that have been made by this Association, as to the cause of those explosions which have occurred to boilers not under its inspection, have shown with what unnecessary mystery this subject has been too frequently shrouded, and that, as a rule admitting of but few exceptions, steam boiler explosions are neither accidental nor mysterious, but may be prevented by the application of common knowledge, and the exercise of common care."

This is our own opinion and every engineer may feel certain that if he understand his business and exercises caution and discretion he will never blow up his boiler.

INACTIVITY.

If a steam engine is stopped suddenly and left unused for a long period, the piston rusts fast in the cylinder, the packing corrodes the rods, and dust thickly covers every part.

When the human frame is inactive and torpid for a length of time the muscles relax, the nerves lose their tone, the organs refuse to perform their functions, and the whole of that great machine—the human frame—is disorganized.

Day in, and day out, men sit poring over ledgers and day-books until they are addleheaded, and the figures swim before their eyes. When evening comes, and business hours are over, instead of taking a walk so as to send the blood dancing and tingling to the remotest part of their frames, they pop into some car and drowsily roll to their doors. A very great portion of the minor ailments flesh is heir to is caused by laziness.

An afflicted individual goes to a doctor; "Something is wrong inside," but he does'nt know exactly where. Thereupon the physician looks grave, and says, "Ah! Dyspepsia;" and forthwith orders tonics, drastic purges, and what not, when all the lazy man wants is a two mile tramp in the Central Park, or a good old fashioned jouncing on a hard-trotting horse.

A certain eastern potentate, feeling himself out of sorts on one occasion, sent for his physician and demanded a cure.

"Take this mace," said the physician, "mount a horse and swing the instrument back and forth, riding meanwhile at full gallop. Certain drugs concealed in the handle will then exude; your excellency will absorb them and be cured." And he was, says the legend; the shrewd man of medicine knew full well that all the king required was fresh air and exercise, and he took this method of prescribing them.

It is better to wear out than to rust out, and shoe leather is far less costly than medical advice.

Stretching the legs relieves the tension on the purse strings, and the cheapest as well as the best medicine for dullness, head-aches, blue devils, stupidity, hypochondria, ill temper, and total depravity, is fresh air and sunlight. These are sovereign remedies, but because they are easily obtained, do not taste bad, and cost nothing, few use them.

THE SWEETNESS OF FERMENTED BREAD.

The little cavities in a loaf of bread, which give it its spongy character, and make it light, are formed by the expansion of little bubbles of carbonic acid gas; and there are three different methods by which these little masses of carbonic acid are mingled with the dough.

In making what is called aerated bread, the carbonic acid is obtained by any economical process, and is then mechanically mixed with the dough by agitating the two together in an air tight vessel. On being placed in a hot oven the bubbles of gas expand, and puff the dough into a spongy mass.

Soda biscuit are raised by setting free carbonic acid from bicarbonate of soda. This salt is composed of soda, carbonic acid, and water, and if it be brought in contact with tartaric acid, the soda leaves the carbonic acid to combine with the tartaric, and the carbonic acid is set free in the form of gas. Advantage is taken of these affinities to distribute carbonic acid gas in minute masses through the dough. Tartaric acid is first thoroughly incorporated with the dough, and then bicarbonate of soda is added and also thoroughly mixed with the mass. The tartrate of soda, formed by the combination of tartaric acid and soda, of course remains in the dough, and is taken into the stomach with the bread.

In fermented bread the carbonic acid is obtained from the flour. All grain contains starch, and by proper treatment starch may be converted into grape sugar, which in its turn may be changed into carbonic acid and alcohol. Both of these changes are effected by fermentation. Panic fermentation is simply the growth of yeast. Yeast is a microscopic plant, and when immersed in a proper liquid and subjected to the proper temperature, it propagates and grows with great rapidity. When it grows in contact with moistened starch it converts the starch first into sugar, and then the sugar into carbonic acid and alcohol. The sweetness of fermented bread is doubtless due to the circumstance that a portion of the sugar formed from the starch remains in the bread without being changed into carbonic acid and alcohol.

CAIGNARD DE LATOUR made the discovery that there is for every vaporizable liquid a certain temperature and pressure at which it may be converted into the aeriform state, in the same space occupied by the liquid.

EXPERIMENTS WITH CAR BRAKES.

Mr. William Loughridge, of Weverton, Md., proposes that the Presidents of the railroad companies in the United States should undertake a series of experiments "to determine the laws of friction governing the retarding of trains, by equipping a train of ten cars, to be controlled by the engineer or brakemen in such a manner as, in my judgment, will secure the greatest safety to trains and economy to the railroad companies."

Mr. Loughridge then specifies the objects he desires to ascertain: we have no space to reproduce them at length. The Presidents of the leading roads in the country have already agreed to pay their share of the expense attending the experiments, provided the sum required of each shall not exceed $100.

The experiments will be made at the Bolton machine shops of the Northern Central Railway, at Baltimore. Further information can be had by addressing Mr. William Loughridge, care of E. W. Barker, 362 North Eutaw street, Baltimore, Md.

WHAT A GREAT THING AN ARMY IS.

If any of our readers wish to form a clear and vivid conception of the appearance and extent of an army of 80,000 men, let them take a look at Mr. Hope's painting of the encampment on the Pamunkey. At the only time when the Army of the Potomac was ever all collected in one body it was fortunately spread out on ground sufficiently level for it to be seen at one view; and, fortunately, one of our best landscape painters was present, and took a careful sketch, from which he has produced a large and elaborate painting.

For several years we have observed Mr. Hope's studies of forest scenes at our artist exhibitions, and have been much impressed with their minute fidelity to nature. Some of our lazy artists, who wish to get a great deal of money for a very little work, affect to sneer at this pre-Raphaelite attention to details; but, for our part, we agree with Ruskin, that this extra finish is "added truth." In art, as in other things, and more especially in art than in anything else, excellence is to be obtained only by tireless labor. Mr. Hope has the same fault that nearly all of our landscape painters have, his landscapes are too nearly of the same color. It requires no great experience to recognize the work of any one of our prominent artists by the characteristic color. Mr. Church's landscapes are an exception to this, his paintings having the innumerable shades of green that are to be found in nature.

In minute and laborious finish Mr. Hope is not to be excelled. In this painting of the Army of the Potomac, every tent, and every tree is carefully painted in the exact position which it occupied in the landscape, the steamboats and schooners are the same in number and in form as those which were afloat at the time on the river, and the long lines of infantry, artillery and cavalry, present the same appearance in the picture that they did in winding their way out of camp. The longer the picture is studied, the more is the spectator impressed with the extent and power of an army of 80,000 men. With the idea of having such a force in our control, we can enter readily into the feelings of Marmion as he contemplated the army of James IV. before the battle of Flodden Field:—

"Oh! well, Lord Lion, has thou said,
Thy king from warfare to dissuade
Were but a vain essay;
For, by Saint George! were that host mine,
Not power infernal nor divine,
Should once to peace my soul incline,
Till I had dimm'd their armor's shine
In glorious battle fray!"

Shocking Occurrence.

On the 8th instant, 2,700 barrels of petroleum, stored in a yard in Philadelphia, took fire. Some of the barrels burst with the heat, and the blazing liquid ran into the streets and filled up the gulleys and sidewalks, so that the lower parts of the houses in the vicinity were surrounded with a lurid sea of flame. The scenes which occurred were harrowing, and no less than six persons—four or five of one family—were burnt to death on the sidewalk. Numbers of houses were laid in ruins, and the damage was very serious.

A NEW bridge has been built over the Mississippi at Clinton, Iowa. It is 3,650 feet long. The draw leaves passage ways, each 123 feet wide, for steamboats.

Patent Claims

ISSUED FROM THE UNITED STATES PATENT-OFFICE

FOR THE WEEK ENDING FEBRUARY 7, 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.

46,201.—Rotary Engine.—Edgar B. Adams, Robt. P. Trimble and Horatio N. Adams, Salem, Ohio:

We claim, first, The combination of an eccentric hub, D, having a groove, g, formed in it, with the revolving ring, B, elongated yoke, A, and sliding pistons, b b', operating substantially as described.

Second, The application of springs, s s', to piston rods, e e', which are connected to a yoke, E, by means of pins, f f, working in slots, i i, substantially as described.

46,202.—Churn.—David C. Aldrich, Anamosa, Iowa:

I claim the partition plates, B B, perforated at their lower ends, and provided with an oblong opening, g, in connection with the air tube, H, in the central compartment, e, and the dashers, C C, in the compartments, d d, all arranged to operate substantially as and for the purpose herein set forth.

I also claim the concave under surfaces, a^s, of the dashers, in connection with the upper inclined surfaces, b^s, the perforated partition plates, B B, and the air tube, H, for the purpose specified.

I further claim the water chamber, b, in combination with the perforated partition plates, B B, dashers, C C, air tube, H, and thermometer, I, as and for the purpose set forth.

[This invention relates to a new and improved churn, of that class commonly termed atmospheric, and it consists in the employment or use of the dashers, perforated partition plates, an air tube, and a water chamber, all arranged in such a manner as to cause butter to be rapidly produced in good condition, and to separate the butter from the buttermilk.]

46,203.—Steam Boiler.—John H. Ames, Baltimore, Md.:

I claim, first, The arrangement of flues, E' E', substantially as and for the purposes set forth.

Second, Producing superheated and saturated steam in a boiler and separating these two forms of steam from each other without injuriously interrupting the water level, substantially as described.

Third, Mixing together superheated and saturated steam in the steam pipe within the boiler, substantially as described.

46,204.—Machine for Separating Lard, Tallow and Grease from the Refuse of Rendering Tanks.—Peter Andrew, Cincinnati, Ohio:

I claim, first, The trap, B, arranged as specified and shown, operating substantially in the manner described for separating the grease from the water, and for the separation of liquids of unequal specific gravity.

Second, I claim the use of wire screens, substantially as described and set forth, for the separation of lard, tallow or grease from the refuse or slush taken from steam rendering tanks, and for the separation of any liquid having no affinity for water, and of less specific gravity from any substance that is not liquid.

Third, I claim the trough or gutter, D, for the purpose of skimming the grease from the surface of the water in the vat, as specified and in the manner described.

Fourth, I claim the perforated water pipe, F, for the purpose of lifting the grease above the screens until it flows into the trough, D, and for continuing the flow and driving it into the trough, substantially as described and shown.

Fifth, I claim the bottom of the vat, formed and arranged as described and for the purpose set forth.

46,205.—Presses.—Stephen J. Austin, Freeport, Maine:

I claim, first, The expanding press box, B, constructed substantially as and for the purpose described.

Second, The ropes or chains, d d' e, pulleys, g g' h h' i m, and windlass, j, applied in combination with the movable side, a, of the press box, B, in the manner and for the purpose substantially as herein set forth.

Third, The pulleys, q q' r r' s s' and t t', applied in combination with the chains, o o', levers, D D', and follower, C, in the manner and for the purpose substantially as shown and described.

Fourth, The double drums, u u', in combination with the chains, o o', levers, D D', and follower, C, applied and operating substantially as and for the purpose set forth.

46,206.—Vessel for Holding Petroleum.—John M. Batchelder, Cambridge, Mass.:

I claim a barrel or other vessel having a lining or interior coat, formed substantially as herein described and for the purpose specified.

46,207.—Cartridge Retractor for Breech-loading Firearms.—Foruyce Beals, New Haven, Conn.:

I claim, first, The hammer, F, provided with the notch, l m, in combination with the ejector, G, when constructed and operating as herein set forth.

Second, I claim the spring, H, when constructed and arranged to operate in combination with the ejector, G, as and for the purpose set forth.

46,208.—Process for Manufacturing Twine from Paper.—E. B. Bingham, Newark, N. J.:

I claim in the manufacture of twine from paper, adding a waterproof sizing to the paper pulp, or applying the same to the paper while the latter is in a moist or green state, on the frame or web, previous to its passage through the final heated pressure cylinders, and previous to its being cut into strips and receiving its twist, as herein set forth.

46,209.—Molder's Bench.—Chas. L. Bishop, Meriden, Conn.:

I claim a molder's bench, composed of a bracket, A, ribs, a, and cleats, d, horizonal arms, B, and brace, C, all constructed and fitted together in the manner substantially as herein set forth.

46,210.—Mess Kit.—Erastus Blakeslee, New Haven, Conn.:

I claim attaching the pan to the kettle in the manner and for the purpose substantially as herein set forth and described.

46,211.—Tobacco Stopper.—John M. Brown, Portland, Maine:

I claim, first, The pipe cover, perforated at the center, and fitted with spring arms, having shoulders, substantially as and for the purposes described.

Second, The stopper or plunger, in combination with the rod and spiral spring, substantially as and for the purposes enumerated.

Third, The combination of the detachable cover, as described, with the spring stopper or plunger, as described.

46,212.—Handle for Lamp Chimney.—Morgan W. Brown, New York City:

I claim a metallic handle, formed as set forth, to clasp upon and be attached to an ordinary glass chimney, in the manner and for the purpose specified.

46,213.—Crane.—Benajah J. Burnett, Mount Vernon, N. Y.:

I claim, first, The cast-iron tower or column, of one or more pieces in hight, with bottom flanges or base, a, vertical cylindrical surface, d, and shoulder, f, all substantially as and for the purpose herein specified.

Second, The construction of the top of said tower, substantially as herein described, with a seat in its interior for the reception of the lower ring, l, of the box which contains the anti-friction balls upon which the cap or revolving head of the crane is supported.

Third, The cast-metal cap or revolving head, C, provided with ribs or inverted brackets, k k, for the reception of the sheave and tension bar pins, l m, and central downwardly-projecting journal, p, entering the box which receives the anti-friction balls upon which the said cap or head is supported, and receiving upon it the upper ring, i, of the said box, all substantially as herein specified.

Fourth, The annular box for the reception of the anti friction balls which support the cap or revolving head, C, constructed of two rings, i l, the one forming the bottom and outer sides of the box, fitted into a seat in the top of the tower or column, and the other forming the top and inner sides of the box, fitted to the journal of the cap or revolving head, substantially as described.

Fifth, The construction of the circular traveler, B, with a flange for the reception of the suspending side branch rods, and with bearings for the reception of the jib shoes, and counter-weight sills, so that each thrusts against the other, and a rolling joint is provided for the said shoes to permit the adjustment of the jib, all substantially as herein set forth.

Sixth, The branch side rods for suspending the circular traveler from the revolving head or cap, constructed with their upper parts single, as shown at G, and with their lower parts in two or more branches, as shown at q q q, in Fig. I, and combined with the cap or revolving head and traveler, substantially as herein described.

46,214.—Bottle for Oil.—Charles W. Cahoon, Portland, Maine:

First, I claim a wooden bottle, made by boring a solid block of wood, and fitted with a stopper, rendered impermeable to liquids, substantially as herein described.

Second, Fastening a stopper into a bottle by means of a button, the ends of which fit into niches, substantially as described.

Third, A bottle having a shoulder and a flaring neck, in combination with a straight side, uniform stopper, as herein described.

Fourth, A bottle fitted with channels, as herein described.

46,215.—Whip-socket Fastening.—H. W. Catlin, Burlington, Vt.:

I claim the washer, B, in combination with the screw, C, passing through the dash, D, into the socket, A, to be arranged substantially in the manner as and for the purpose set forth.

46,216.—Bean Harvester.—Norman Chappell, East Avon, N. Y.:

I claim the clearer or clearers, H, in combination with the cutter or cutters, G and a suitable frame, A, arranged and operating substantially as herein set forth.

In combination with the clearers, H, cutters, G, and frame, A, I also claim the coulters, I, arranged and operating substantially as herein specified.

46,217.—Packing for Oil Wells.—John R. Cross, Chicago, Ill.:

I claim the arrangement for artesian oil wells of a fibrous material, D, consisting of hemp or other elastic substance, in combination with the rings, A A', or other suitable frame therefor, so arranged that when said rings approach each other the packing material is compressed laterally, so as to fill the space between the tube and sides of the well, and relaxed when the rings are made to recede, the same being operated from the top of the well by the screw rods, d d, substantially in the manner and for the purpose set forth.

I also claim, in combination with said packing device, the valve, f, and tube, g, operating in the manner and for the purpose herein set forth.

46,218.—Ladies' Dress Protector.—Theodore D. Day, New York City:

I claim an interior lining or facing for the lower edge of the skirt of ladies' dresses or other garments, formed with springs introduced in the manner and for the purposes specified.

46,219.—Fire Engine.—John N. Dennisson, Newark, N. J.:

I claim the increasing or diminishing the effective area of the pump or pumps by means of a valve placed in the partition between them, or other means, substantially the same as when attached to the steam fire engines, so that the quantity of water discharged at a stroke can be increased or diminished at pleasure without altering speed or stroke, for the purposes herein set forth.

46,220.—Ball Screw for Fire-arms.—Arthur De Witzleben, Washington, D. C.:

I claim the tines or jaws, b b, with their threads or shoulders, a a, forming in combination the concave screw for the uses and purposes as above described.

46,221.—Paper-covered Wooden Boxes.—M. P. Dorsch, New York City:

I claim a box for collars and similar articles, made of a thin veneer of wood, with the top and bottom pieces secured to the sides by a strip of paper or other similar material glued around the said edges, and the box covered with paper, as specified, the whole forming a new article of manufacture

46,222.—Operating Guns in Turrets.—James B. Eads, St. Louis, Mo.:

First, I claim mounting a gun or guns upon a rotary platform, arranged to bring the muzzles of the guns to different ports in the turret or defense, within which it rotates, when the power which operates the guns is communicated through devices acting concentrically with the axis of rotation of said platform.

Second, Mounting guns on a rotating platform, which is arranged to rotate with a turret, when the power to operate the guns on said platform is conveyed to them through mechanical devices acting concentrically with the axis of said platform's rotation.

46,223.—Operating Guns and Gun Turrets.—James B. Eads, St. Louis, Mo.:

First I claim the use of a rotating tower, in combination with a rotating gun platform, when each is arranged to rotate independently of the other.

Second, The combination in one turret of devices for training ordnance operated by means of power transmitted through the pivot or shaft of the platform on which the ordnance is mounted, with a rotating platform and a rotating tower, each arranged in such a manner that the training of the guns, the rotating of the platform and the revolving of the tower may be performed independently of each other, substantially as described.

46,224.—Bread and Meat Slicer.—John E. Dow, Boston, Mass.:

I claim the application and arrangement of the slicer in the mode above described, or substantially the same.

46,225.—Revolving Fire-arm.—Wm. H. Elliott, Plattsburgh, N. Y.:

I claim, first, Dividing the cylinder, a, through its circle of chambers into two concentric parts, and having the recoil plate or breech permanently attached to the outer section, so that the core or central portion may be drawn out in a forward direction, for the purpose of introducing the cartridges, substantially as herein described.

Second, Charging the cylinder of a revolving pistol by first introducing the cartridges into the center of it, and then by pushing them in a lateral direction to their places, as herein described.

46,226.—Machine for Clipping Hair or Wool from Animals.—Charles W. Emery, Dorchester, Mass.:

I claim the upper guard, i, for holding the hair or wool erect to facilitate the cutting, as herein set forth.

46,227.—Lanterns.—Chas. Engelskirken, Buffalo, N. Y.:

I claim the expanding and contracting button, F, constructed and operating for the purposes and substantially as described.

46,228.—Fire-proof Safe.—John Farrell, New York City:

I claim the employment of sulphate of magnesia in filling in the fire-proof chambers of safes, chests and other like structures, when prepared and put in, substantially as and for the purpose specified.

46,229.—Trip Hammer.—H. E. Fessel and F. Krautwadl, Chicago, Ill.:

I claim the combination and arrangement of the devices, e f g, constituting both a tripping and adjusting contrivance, with the friction rollers, c c', crank shaft, E, and hammer, F C, in the manner and for the purpose described.

46,230.—Combining Aluminum with Vulcanite and other materials.—Nathl. C. Fowler, Yarmouth, Mass.:

I claim so combining granulated aluminum with vulcanite or rubber or analogous material, such as gutta-percha, forming a compound or composition of matter, substantially as described.

Second, I claim the use of aluminum for the purpose of forming the joinings of articles made of vulcanite, for attaching rubber or vulcanite to other material, and for inlaying and ornamenting articles of vulcanite.

Third, I claim the use of vulcanite, for the purpose of attaching articles made of aluminum to other materials, or to other articles made of aluminum.

Fourth, I claim inlaying articles made of aluminum with vulcanite and imitating articles made of aluminum by a clasp, rivet or other fastening or ornamental device made of vulcanite.

46,231.—Lubricator.—Thomas W. Goodwin, Portsmouth, Va.:

First, I claim the arrangement within a lubricator of a single cock, having three or more openings, arranged in such a manner as to make an induction and eduction passage, when used as and for the purposes herein described.

Second, In combination with a lubricator, I claim the mode of charging and discharging the reservoir, by means of a single cock, arranged within a lubricator, when used substantially as described.

46,232.—Ladies' Paper Collar.—Solomon S. Gray, Boston, Mass.:

I claim as a new article of manufacture a paper, or cloth and paper collar, to which the requisite curve or shape is given by contracting one of its edges, substantially as described.

46,233.—Tobacco Paper.—Holman J. Hale, New York City:

I claim tobacco paper made substantially as above described.

I also claim the use of tobacco paper made substantially as described in the manufacture of tobacco cartridges and tobacco rettes, made from said material, substantially as above set forth.

46,234.—Voltaic Shoe Soles.—Thomas Hall, Boston, Mass.:

I claim the combination of the non-conducting sole or base, with a series of alternate plates of dissimilar metals lapping upon each other, so that their points of contact may be kept bright by the friction curved by the motion of the foot, and allowing the moisture or perspiration of the foot to act upon both metals at the juncture of the plates.

46,235.—Wire Fork for Toasting, Etc.—Thos. Geo. Harold, Brooklyn, N. Y.:

I claim, first, Constructing an apparatus for toasting, broiling, etc., of two clamps, pressed toward each other by a spring or springs, in substantially the manner described and shown.

Second, I claim retaining the said clamps in correct position to each other by guides, in the manner and for the purpose specified.

Third, I claim the combination of the clamps, a a', spring, b, and guides, c or e, for the purposes set forth.

46,236.—Hanger for Lamps.—Thomas S. Hudson, East Cambridge, Mass.:

I claim the lamp-support hanger, as composed of the series of glass tubes, the end caps or cups, the rod or its equivalent, and the end attachments, arranged relatively to one another, substantially as described.

46,237.—Shears for Cutting Metal.—Julius Hornig, Oswego, N. Y.:

I claim, first, the metal shears connecting the shear-lever to the eccentric by means of a strap guided in a groove on the eccentric, in combination with a radial arm secured to the lever by means of a pin, L, on which it is free to vibrate, substantially as above described.

Second, I also claim the curved face, d, of the upper end of the shear lever, in combination with an eccentric against whose face it moves, and against which it is held by means of a radial vibrating arm, K.

Third, I also claim forming shoulders, s, on the faces of the washers, O, and shoulders, t, on the faces of the bosses or projections, q, in order to prevent the rotation of the washers during the vibrations of the lever, substantially as described.

[This invention consists in a novel method of holding the free end of the lever of a shears up to, or rather of connecting it with, the eccentric which operates the shears, and also in the application of a washer to the hub or trunnion of the shears.]

46,238.—Device for operating Safety Valves.—William S. Hudson, Paterson, N. J.:

I claim the bell crank levers in combination with the means, L M, or their equivalents, for rapidly changing the initial tension of the spring, I, within wide limits, substantially as and for the purpose herein set forth.

46,239.—Key Fastener.—Henry Hungerford, Brooklyn, N. Y.:

I claim the combination and arrangement of the bolt, C, constructed substantially as described, and its guide or case, B, with the perforated key, the whole combined and operating substantially as and for the purposes set forth.

46,240.—Extension Table.—Anthone Iske, Lancaster, Pa.:

I claim the central column or support, A, with its cross pieces, B C, and slots, d, in combination with the cross slats, e, and their sliding pivots, 2 3 4 and 5, in said slots, d d d d, arranged and operating substantially in the manner and for the purpose specified.

46,241.—Lock.—Henry Jackson, Brooklyn, N. Y.:

I claim stub, F, constructed as described of a plurality of movable plates, c c, of unequal length or projection, employed in combination with the tumblers, E, in the manner and for the purpose specified.

[The object of this invention is to prevent a lock being picked or opened illegitimately by obtaining a pressure of the stub on the tumblers—a means usually resorted to by burglars in order to ascertain the position the tumblers must be brought to in order to admit of the bolt being liberated.]

46,242.—Machine for Pointing Wires in the Coil.—C. Jillson, Worcester, Mass.:

I claim combining the cutter head and pattern with a revolving shaft having a spring or yielding roll within it, as and for the purpose herein described and represented.

I also claim, in combination with a revolving cutter head and pattern, the extending of the cutter stock or cutters that are operated by said pattern clear through the cutter head, so that said cutters will not be thrown out or in any wise moved by the centrifugal force of the revolving head, substantially as described.

46,243.—Revolving Firearm.—Benjamin F. Joslyn, Stonington, Conn.:

I claim the rod, I, and its transverse rod, m, in combination with the recessed and inclined end of the hammer—the whole being arranged and operating for the locking and unlocking of the cylinder substantially as and for the purpose herein set forth.

46,244.—Apparatus for Evaporating and Calcining Alkaline Solutions.—Morris L. Keen and Hugh Burgess, Rogers Ford, Pa.:

We claim a furnace constructed for the purpose of evaporating the alkaline solutions used in the pulping and disintegrating of vegetable substances, in which the heat is utilized by means of an arrangement of pans, or their equivalents, substantially as and for the purpose described.

We also claim, in combination with the main evaporator, the finishing or calcining furnace or furnaces, substantially as described.

46,245.—Corn-sheller.—Charles Ketchum, Penn Yan, N. Y. Ante-dated Jan. 29, 1865:

I claim, first, The cylinder, H, when made as specified and used for the purpose set forth.

Second, I claim the concave when composed of the sections, F, substantially as specified.

Third, I claim the guides, M, and agitators, I, when constructed, arranged and used as specified.

Fourth, I claim encasing the concave, substantially as specified, and for the purpose set forth.

Fifth, I claim the plates, B and C, and hopper, L, when constructed

as specified and used in combination with the other parts of the machine as set forth.

46,246.—Tapping Branch for Water and other Pipes.—Henry Knight, Brooklyn, N. Y.:

I claim as a new and improved article of manufacture the flanged cup, A, having one end closed, and otherwise adapted to form connections for pipes.

46,247.—Process for Preserving and Restoring Natural Flowers.—Angelina J. Knox, Boston, Mass.:

I claim the process for restoring, treating and preserving natural flowers, substantially as herein before described.

46,248.—Car-bumper Attachment.—John P. Laird, Altoona, Pa.:

I claim, first, The guide plates, F, imbedded in the wooden blocks, E E, and secured to the beams of the car, all substantially as and for the purpose herein set forth.

Second, The stirrup, N, confined between the beams, E E, and secured to the bumper beams, substantially as specified.

Third, The adjustable stopping blocks, M, ad pted to the plates, F and G, and to a bolt, b, which passes through the same, all substantially as set forth for the purpose specified.

46,249.—Ventilating and Check Draught Damper.—James A. Lawson, Troy, N. Y.:

I claim the employment of a horizontal damper in any stove or furnace exit-pipe, and of less diameter than such pipe, and above a vertical cylinder damper around such pipe, so as to more effectually check the draught by bringing the hot air within the said pipe in contact or conjunction with cold air admitted from room surrounding such pipe through said vertical cylinder damper, in the manner substantially as herein described and set forth.

I also claim the combination of the vertical cylinder damper, B2, with the horizontal damper, C, arranged immediately over the said vertical cylinder damper, B2, in the manner substantially as and for the purposes herein described and set forth.

46,250.—Heaters for Buildings.—James A. Lawson, Troy, N. Y. Ante-dated Nov. 15, 1864:

I claim the employment of the return flue space or chamber, G, in combination with the vertical pipes, D and E, and with the fire chamber A, in the manner and for the purposes substantially as herein described and set forth.

46,251.—Shutter Hinge.—Robert Lee, Cincinnati, Ohio:

I claim as a new article of manufacture the shutter hinge herein described, consisting of the parts, A B, flange C, the radial notches, c c c, gravitating catch, D, fulcrum pin, d, and hand lever, E, all constructed, arranged and operating as specified.

46,252.—Feed Water Heaters for Steam Boilers.—Wm. A. Lighthall, New-York City:

I claim the heater, I, arranged as described, and placed between the exhaust of a steam engine and the condenser, A, as and for the purpose set forth.

46,253.—Condenser Case.—Wm. A. Lighthall, New York City:

I claim the manner of constructing the sides, A A', of the case, with the apertures, a, combined with the manner of securing the tube sheets, B B', and division plates, D D (or either of them), in place, as herein set forth.

46,254.—Condenser.—Wm. A. Lighthall, New York City:

I claim, first, The combination of the division plate, C', with the section of cooling tubes, A, as and for the purpose set forth.

Second The combination of the division plate, C', with the tube sheet and cover to the end of the case (as shown), for the purpose of dividing the space between the said tube sheet and cover into two sections as set forth

Third, The arrangement of the cooling water receiving nozzle, B, the cooling water delivery nozzle, D, the steam nozzle, E, the condensed water nozzle, G, and the division plate, C', placed at the same end of the apparatus as shown, and for the purposes set forth.

46,255.—Funnel.—C. L. Lochman, Carlisle, Pa.:

I claim the valve or stopper, c, with its handle and connecting rod, h and l, or their equivalents, the elastic cone or washer, g, or its equivalent, the cock, d, and springs or catches, m m, constructed and connected substantially as and for the purposes specified.

46,256.—Drafting Scale.—Josiah Lyman, Lenox, Mass.:

First, I claim such an arrangement, application and graduation of the beveled edge of the scale herein set forth as render it a universal reliable guide to the needle point in making a dot on the paper at the end of any required or given distance.

Second, The arrangement and application of the slide spring, as set forth, to the scale herein described, by which it is brought in contact with and becomes a part of the protracting trigonometer, or of a T square.

46,257.—Hoisting Apparatus.—Walter K. Marvin, New York City:

I claim the method herein described of applying power to hoisting apparatus by the employment of friction pulleys operating by compression upon a rope or cable or the equivalent therefor, substantially in the manner herein set forth.

46,258.—Hobby Horse.—P. J. Marqua, Cincinnati, Ohio:

First, I claim the combination rearing hobby horse, A, vibrating beam B, seat, I, and spring, K, arranged and operating substantially as set forth.

Second, The slots, G G', and the devices for the relative adjustment of the seat and horse as explained.

Third, The arrangement of the rearing hobby horse, A, seat, I, reins, O O', and pulley, T, adapted to operate as set forth.

Fourth, I claim the India-rubber thong, K, and clamp, L L' M, arranged as set forth.

46,259.—Breech-loading Ordnance.—John A. Miller, Paducah, Ky.:

I claim the shape and construction of the balance, C, operating in a corresponding curved aperture, E, in the breech of the gun, in combination with the support, B, as herein described, for the purpose of firing cannon rapidly.

46,260.—Evaporator for Saccharine and other Liquids.—Jonathan E. Morse, Boston, Mass.:

I claim a train of evaporating pans with furnaces and flues arranged to operate in connection therewith, substantially as described.

Also, the employment with an open evaporator of a cover and steam jets, when arranged to operate substantially as specified.

46,261.—Machine for Bending Sheet Metal.—Samuel Pennock, Kennett Square, Pa.:

First, The hinged removable and adjustable bedplate, C, constructed and operating as described.

Second, In combination with the above, the mode described of adjusting the bedplate, C, horizontally by means of the eccentric, G, arranged and operating as shown, or in an equivalent manner, for producing the same result.

Third, In a machine for bending metal constructed as described, adjusting the bedplate, C, vertically, by the employment of the eccentric, R, arranged and operated as shown, or its equivalent, substantially in the manner specified.

46,262.—Horse-shoe Calk.—James L. Pike, Lynn, Mass.:

I claim as a new article of manufacture a horse-shoe calk of chilled or "case-hardened" cast iron, constructed substantially as and for the object specified.

46,263.—Mangle.—Wm. Radbourne, Rahway, N. J.:

I claim the application to a mangle of the semi-elliptical spring, D, acting simultaneously on both boxes of the roller, C, in combination with friction rollers, e, supporting the gudgeons of the lower roller, constructed and operating substantially as and for the purpose set forth.

[This invention relates to a mangle the lower roller of which has its bearings on friction rollers, while its upper roller is pressed down by the action of a semi-elliptic spring and thumbscrew in such a manner that one spring and screw are sufficient for both ends of said roller, and that by the action of the friction rollers the power requisite to operate the mangle is materially reduced. The frame of this mangle is provided with two hinged tables, one on either side of the rollers, and provided with hinged legs in such a manner that when the mangle is not used, said tables can be readily turned down out of the way, and when the same is used, one or both tables can be turned up instantaneously, and the clothes are run through the rollers with great convenience.]

46,264.—Belt Coupling.—A. C. G. Rathburne and A. M. Comstock, Lyme, Conn.:

We claim the plate, A, provided with a slot, a, and operating in combination with the toggle jaws, B, substantially in the manner and for the purpose set forth.

[This invention consists in the employment or use of a plate provided with a slot to admit the ends of the belt to be coupled and with two toggle jaws in such a manner that when the jaws are thrown open, the ends of the belt can be easily passed up between them, and the jaws are depressed after the ends of the belt have been adjusted; they clamp the same tight without the use of rivets or any other fastening, and a belt coupling is effected which leaves the inner or working surface of the belt perfectly flat and intact.]

46,265.—Washing Machine.—Orrin Reeve, Greenport, N. Y.:

I claim in combination with a tub having ribs, a, on its inner perimeter extending from the bottom to the top thereof, and radial flutes or ribs on its bottom, a rubbing board to act in conjunction therewith, having a scalloped perimeter and radial ribs on its under side, as and for the purpose herein described and represented.

46,266.—Vapor Lamp.—J. J. Riddle, Cincinnati, Ohio:

I claim, first, The use of the needle, n, working through the burner and from the outside of the lamp into the valve, d, in combination with the oil tube, O, reservoir, A, and air pump, P, all constructed and operating in the manner and for the purpose substantially as herein shown and described.

Second, The valve, S', applied in combination with the case, t, and air pump, P, as specified.

Third, Placing the valve seat, d, in the top of the burner, substantially as shown in figure 3, for the purposes set forth.

Fourth, The combination of the socket, R', and pipe, g'', with the oil tube, O, needle, n, valve seat, d, air pump, P, and reservoir, A, constructed and operating in the manner and for the purpose herein specified.

[The object of this invention is a vapor lamp which combines cheapness and simplicity with few or no joints liable to work loose, and in which all the parts are so arranged as to be repaired easily and quickly.]

46,267.—Trip-hammer.—T. J. Root, Galena, Ill.:

I claim the rock shaft, B, with hammer rod, C, attached, in combination with the knuckle-jointed arm, H I, provided with the spiral spring, J, and treadle, F, all constructed and arranged to operate as and for the purpose herein set forth.

[This invention consists in attaching the rod of a hammer to a rock shaft or head which is connected by means of a bent arm and rod to a treadle, the treadle rod having a spring applied to it, and all arranged in such a manner that the operator by means of his foot acting upon the treadle is enabled to give the proper movement to the hammer—the latter after giving its stroke quickly using and operating smoothly throughout without any irregular movement, and with but a moderate effort on the part of the operator.]

46,268.—Machine for Jointing Oval Frames.—James E. Rogers, Chelsea, Mass.:

I claim as my invention the jointing apparatus or machine, composed of the two platforms, A B, the stops, b f, and adjustable rests, C D, arranged and constructed substantially in manner and so as to operate as and for the purpose specified.

46,269.—Tobacco Pipe.—Louis Saarbach, Philadelphia, Pa.:

I claim the curved tube, A, combined with the detachable bowl, c, in which powder is glazed, while the process of glazing is going on, for the purpose of glazing and drying the powder at one operation, substantially as above described.

We also claim the method of carrying the same into operation by means of hot air and the apparatus above described, substantially as above set forth.

46,276.—Buildings or Rooms for the preservation of Food and for other purposes.—Daniel E. Somes, Washington, D. C.:

I claim, first, The walls and chambers as described in combination with the cooling and ventilating pipes, constructed and used as and for the purpose set forth.

Second, The series of rooms and buildings, substantially in the manner and for the purpose shown.

Third, The series of walls and chambers when used in combination with a process of rarification and ventilation and cooling appliances.

Fourth, I claim cooling the air in buildings in which water tanks or pipes are used by passing the air tubes or ducts through, in between, or around the water pipes or tanks.

46,277.—Refrigerator for Preserving Articles of Food.—Daniel E. Somes, Washington, D. C.:

I claim, first, A refrigerator with multiple walls and so constructed that the interior shall be separated from the cooling substance thereby excluding dampness.

Second, The use of cork for the walls in the manner and for the purpose shown.

Third, The use of glass for the walls as and for the purpose set forth.

Fourth, The pipe larger at the bottom than top substantially as described.

Fifth, The air tight compartments substantially as and for the purpose shown.

Sixth, The vulcanized rubber tubing or its equivalent when used in the manner set forth.

Seventh, The vulcanized rubber tubing when applied to any door or drawer for a similar purpose.

46,278.—Eccentric Adjustment.—J. M. Stone, North Andover, Mass.:

I claim for the purpose of adjusting the amount of throw of any of two or more eccentrics on the same shaft. The construction and arrangement operating substantially as described.

46,279.—Paper Collar Button-hole Punchers.—Samuel S. Stone, Troy, N. Y.:

I claim, first, Two oblong, male end button-hole punchers, L L, arranged lengthwise or nearly so to each other upon, and adjustable longitudinally with two separate simultaneously reciprocating slides, H H, in combination with two corresponding oblong female punch receiving dies, N N, having like arrangement and longitudinal adjustment on a stationary bed, substantially as herein described.

I also claim two oblong end button-hole punchers adjustable axially on and longitudinally with two separate simultaneously reciprocating slides in combination with two corresponding punches receiving dies having like axial and longitudinal adjustment on a stationary bed, substantially as herein described.

I also claim two oblong end button-hole punchers, L L, arranged lengthwise or nearly so to each other and a central one, M, arranged crosswise thereto on separate simultaneously reciprocating slides, H H, and I, and with the central punch and slide adjustable transversely to the end ones, in combination with two corresponding punch-receiving end dies, N N, and a transversely adjustable central one, O, on a stationary bed substantially as herein described.

I also claim two oblong end button-hole punchers arranged lengthwise or nearly so to each other and a central one placed crosswise thereto on separate reciprocating slides, and with the end punchers and their slides adjustable longitudinally in combination with corresponding central and longitudinally adjustable end punch-receiving dies on a stationary bed, substantially as herein described.

I also claim two oblong end button-hole punchers arranged lengthwise, or nearly so to each other, and a central one placed crosswise thereto, on separate simultaneously reciprocating slides, with the end punches and their slides adjustable longitudinally and the central ones transversly in combination with corresponding longitudinally adjustable punch-receiving end dies, and a transversly adjustable central one on a stationary bed, substantially as herein described.

46,280.—Apparatus for Carbureting Oil.—John B. Terry, Auburndale, Mass.:

I claim the combination of one or more air cells, and vibratory scoops or buckets applied together and within the cistern, A, substantially in manner and so as to operate therewith as described.

I also claim the combination of the "Barker's Mill," or rotary air and agitating distributer, K, with the vaporizing cistern, B, the cistern, A, and its air forcing apparatus.

I also claim the combination and arrangement of the shaft, F, its arms and sponges, or their equivalents, with the agitating and air distributer, K, the cisterns, A B, and the air forcing apparatus of the cistern, A.

I also claim the combination of the friction brake apparatus, consisting of the lever, W, the constructing rod, Y, the arm, z, the screw shaft, a', and the stud, b', or its equivalent for the purpose set forth with the air forcing apparatus and the vaporizing cistern, B, provided with the bell, c, to operate as specified.

I also claim the said friction apparatus constructed substantially as described as well as its arrangement with respect to the bell, c, and the vibratory sector as specified.

46,281.—Machine for Planting Potatoes.—Joseph S. True, Garland, Maine:

I claim, first, A reciprocating slide provided with one or two boxes and arranged in relation with bottom plates one or more to operate in the manner substantially as and for the purpose herein set forth.

Second, A horizontal stationary cutter or knife arranged with a reciprocating slide and boxes to operate substantially as and for the purpose specified.

Third, The placing of the cutter or knife in such a relative position with the sliding boxes that the latter will feed or convey the potatoes to the former both above and below it as set forth.

Fourth, The furrow share, F, at the bottom of the seed-conveying tube, F, the covering shares, G G, and roller, I, when used in combination with the potato-dropping device, substantially as and for the purpose set forth.

[This invention relates to a new and improved machine for planting potatoes, and it consists in a novel arrangement of parts where by the potatoes may be cut or not as desired, planted either in hills or drills, different quantities of seed discharged at regular intervals as may be required, and the machine rendered capable of being manipulated or worked with the greatest facility and adapted for use on various kinds of ground, rough or smooth, mellow and friable or hard and clayey.]

46,282.—Bill Holder.—Charles T. Wakeley, Madison, Wis.:

I claim the hasps or fasteners, C, and D, in combination with the straps and bands, I, and H, adjustable in the manner and for the purposes shown and described.

46,283.—Soda-water Apparatus.—Frederic A. Weber and Wm. H. Greene, Woonsocket, R. I.:

We claim the valve case, d, when arranged within the box, a, and with the system of sirup pipes, i, fountain pipe, e, and outlet pipe, f, connecting therewith, the valves in the sirup and fountain pipes being operated by a system of levers and valve rods, and the whole constructed and arranged substantially as shown.

46,270.—Mode of constructing Dolls' Heads and other Toys.—Lucretia E. Sallee, Decatur, Ill.:

I claim, first, Making dolls' heads and other toys of an outer covering of leather, or its equivalent, and an inner body of cement, which sets and hardens, so as to support the said covering in shape, substantially as above described.

Second, I also claim the cement or composition above described for making a body or backing to sustain the outer surface of the toy.

[This invention consists in making the heads of dolls and other toys of such materials and in such a way as to prevent them from being easily broken by falls or other violence which may happen to them.]

46,271.—Seeding Machine.—William Saxton, Venice, Mich.:

I claim, first, The pivoted seed distributing plates, H, arranged within the seed-box, D, in combination with the projections, d, on the wheels, B B, the springs, c, on the adjustable seed-box, D, all arranged substantially as and for the purpose herein set forth.

Second, The coverers, J J, attached to the seed-box by links, K K, in connection with the cord or chain, L, substantially as and for the purpose herein described.

[This invention relates to a new and improved seeding machine of that class which drops the seed in hills, and it consists in a novel and improved seed-dropping mechanism, and in a novel arrangement of the seed-box or hopper and coverers, whereby several advantages are obtained.]

46,272.—Brick Molds.—John F. Schuffenecker, Saint Louis, Mo.:

I claim operating the bottoms of the molds by means of the lever, D, rod, F and G, link, I, and axles, E E, for the purpose above specified.

46,273.—Machine for making Bricks.—John F. Schuffenecker, Saint Louis, Mo. Ante-dated Feb. 3, 1865:

First, I claim the manner adopted by using the toe, j, pan, i, cup, k, and tube, h, in combination, for the purpose herein described.

Second, I claim the scraper, A, operated by the cams, i i, fork lever, j, and joint, K, as for the purpose above described.

Third, I claim the manner to secure the position of the scraper, A, by means of the spring, Z, and arm, I, as shown in the specification.

Fourth, I claim the manner adopted to regulate the friction of the machine by the cams, u u, lever, t, guide, g, set screw, h, in combination of the slot of the rod, x, as shown and described in the foregoing specification.

Fifth, I claim the mode adopted to prevent the clay from settling between I opper and the quadrant by means of the plate, S, grooves, R, steel bar, m, and set screws, Q Q Q Q, or their equivalents, for the purpose set forth.

46,274.—Cultivator and Harrow.—Thomas Short, Fairmount, Ill.:

First, I claim the frames, D D, provided with shovels, E, and teeth, F, the clevises, a d, and screws or bolts, a1, in combination with the adjusting frame, G H, the latter permitting the cultivator frames to be operated simultaneously or independently, and adapting said frames when used as a harrow to be brought together at their rear ends, as herein specified.

Second, I claim the combination of the treadles, I, loops, J, and connecting rods or wires, l, for adjusting the frames, D D, substantially as explained.

[In this machine a novel and very simple arrangement of devices is provided to facilitate the vertical adjustment of the shovels to avoid obstacles; and in addition to this feature the cultivator frames are provided with harrow teeth, and the frames are adapted to be reversed in such manner that the said teeth may be presented in a downward direction, so as to convert the implement into a harrow when desired.]

46,275.—Drying and Glazing Gunpowder.—William S. Bates, Westfield, Mass., and Catharine S. Smith, Kingston, N. Y., executors of John Smith (dec'd).

We claim the application of heat to the cylinders or other vessel

46,284.—Draught Tube for Soda-water Apparatus.—Frederick A. Weber and Wm. A. Greene, Woonsocket R. I.:

We claim the construction of a draught tube for soda-water apparatus, with an inner tube, b, having an outlet, d, and lateral orifices, e, opening into the tube, a, and controlled by a gate, f, the whole being constructed and arranged to operate substantially as set forth.

46,285.—Corn Plow.—Wm. S. Weir, Jr., Monmouth, Ill.:

I claim the curved rods, M, attached to the back end of the bars, d d, and bent in the form of hooks, k, at their lower ends, in connection with the lever, o, attached to the back end of the draught pole, C, all being arranged and applied substantially as and for the purpose specified.

[This invention relates, first, to a new and useful equalizing attachment, for equalising the draught of the machine; second, in an improved manner of attaching the plows to the main frame of the machine, whereby the former may be raised and lowered, and adjusted laterally, as may be required, with the greatest facility; third, in a novel and improved means for holding the plows in an elevated state out of the ground, when the machine is being drawn from place to place, or when being turned at the ends of rows.]

46,286.—Magazine Breech-loading Fire-arms.—Henry F. Wheeler, Boston, Mass.:

I claim a fire-arm, having a sliding barrel, the charge of which, nserted at the breech, is fired by driving back the barrel against a percussion or breech block.

I also claim the swinging breech or percussion block, constructed and arranged to operate with respect to the barrel and the magazine or cartridge tube, substantially as set forth.

I also claim the magazine or cartridge tube, when arranged to connect with and be disconnected from the barrel, substantially as set forth.

I also claim holding the barrel in forward position, or the arm cocked, by the employment of the forward end of the magazine tube, substantially as described.

I also claim the arrangement of the breech or percussion block to swing above the path of movement of the cartridge tube, to permit the connection of the cartridge tube and barrel and the cocking of the piece.

Also the arrangement of the cartridge tube, to allow of its movement to permit the descent into place of the breech block, and the spring movement of the barrel.

I also claim the manner of withdrawing and expelling the shell of the exploded cartridge by detaining it upon the cartridge tube or breech block, and throwing it therefrom, substantially as set forth.

I also claim producing the forward movement of the barrel and the downward movement of the cartridge tube by the direct action of the trigger lever, substantially as set forth.

I also claim the arrangement of a barrel within a case or cylinder containing the spring, by which the rear or percussion movement of the barrel is produced.

I also claim so combining the magazine tube and percussion block that they move together or as one piece, substantially as set forth.

46,287.—Apparatus for Calcining Ores.—George W. White, New York City:

I claim, first, The combination in the rotating cylinder of separate combustion and calcining flues or passages, substantially as and for the purposes herein specified.

Second, The furnace located at the opposite end of the rotating cylinder to that at which the ore or other substance to be calcined enters, substantially as and for the purpose herein set forth.

Third, So combining the calcining flues or passages of the rotating cylinder with the furnace, that the gases eliminated from the ore or other substance in the said passages may enter into combustion in the furnace, substantially as and for the purpose specified.

Fourth, In a rotating cylinder, with separate combustion and calcining flues or passages, combined with a furnace, as described, I claim constructing the inner surfaces of the separate calcining passages with grooves, cavities or projections, substantially as and for the purpose herein specified.

Fifth, The coiled perforated water pipe, f, placed in the smoke stack or vertical flue, in combination with the rotating cylinder, substantially as and for the purpose herein specified.

46,288.—Clasps for Wearing Apparel.—Frederick Wood, Somerville, Mass.:

I claim the improved fastener, as composed of two parts, A B, made substantially as described.

46,289.—Pencil Sharpener.—Rufus Wright, New York City:

First, I claim the spiral and tapering cutter, A, constructed in the manner and employed for the purpose herein specified.

Second, I claim the guard, B, formed in one piece, with the cutter, A, and employed to protect the same, and as a protection from the same, as set forth.

Third, In combination with a guard, B, constructed as herein described, I claim the angular groove, O', for pointing the lead.

46,290.—Mop Holder.—Thomas C. Ball (assignor to Lewis Graham, Henry Harlow and A. G. Washburn), Springfield, Vt., and said Henry Harlow and A. L. Thompson, administrator of the estate of Lewis Graham, assignors to A. G. Washburn. Ante-dated Feb. 14, 1863:

I claim the combination and arrangement of curved springs, a a a a, substantially as described, with the slotted head, B, as set forth.

46,291.—Forming Paper Collars.—William S. Bell (assignor to himself and W. S Bell, Jr.), Boston, Mass.:

I claim the improved method of treating paper collars or collar blanks, to define and determine the line of fold, substantially as set forth.

46,292.—Cartridges for Breech-loading Rifled Fire-arms.—Hiram Berdan (assignor to Levi P. Morton, trustee of Hiram Berdan, Abia A. Selover and Wm. B. Benson), Boston, Mass.:

I claim an indestructible cartridge case, with an irregular exterior to correspond with the counter bore, with which it is to be used, and a rifled interior, to correspond in size and form with the bore proper, in combination with one or more projectiles previously prepared, to fit the rifling of the bore, the whole constructed and arranged substantially as herein described, so that the chamber will be protected from fouling, and the balls properly located in respect to the rifling of the bore, without the necessity of their entering the latter in the act of loading.

46,293.—Coal and Ash Sifter.—Abijah E. and Josiah B. Blood (assignor to themselves and Wm. J. and Benjamin F. Larabee), Lynn, Mass.:

We claim, first, The construction of coal sifters, with a vibratory bottom, C C, separate from the inclosing case, B B A A, carrying the screen, D, or wire cloth, E, with free movement independently of the stationary case.

Second, The construction of the vibratory bottom or screen, E, with a decided convexity upward.

Third, The combination of the case, A A B B, with the cross bar, Q, fastened thereto, the operating rod, D, and the independent convex screen, E, substantially as described and for the purpose set forth.

46,294.—Picking Cylinders of Machines for Disintegrating Fibrous Materials.—Seth Boyden (assignor to Henry H. Jacques), Newark, N. J.:

I claim binding the picker cylinders of pickers for disintegrating fibrous materials, as and for the purpose described.

46,295.—Flexible Pipe for Mining.—Anthony Clark (assignor to himself and Gorham Blake), Todds Valley, Cal.:

I claim the improved flexile conduit, made as described, viz., of metallic pipes, cloth connections, clamping rings, valves and valve openings, constructed and arranged together, substantially as represented and explained

46,296.—Coat and Hat Rack.—George F. J. Colburn, Newark, N. J., assignor to James T. and Horace A. Pratt, New York City:

I claim the combination of the hook, C, bar or strip, A, attachments, D D, constructed, arranged and applied in the manner and for the purpose set forth.

46,297.—Rivets.—John N. Dennison (assignor to himself and Gould Brothers), Newark, N. J.:

I claim a rivet or a washer, with a projecting edge, constructed in the manner and for the purpose herein above specified.

46,298.—Tree Protectors.—Theophilus Hilton, Providence, R. I., assignor to himself and Wm. D. Hilton, Cranston, R. I.:

First, I claim the hood, C, for a tree protector, composed of the flanch, b, rod, c, and lip, a, and united by means of a clasp, e, the whole constructed substantially as described.

Second, I claim the construction of a hood, as described, or its equivalent, with a trough or its equivalent, encircling the trunk of a tree, substantially as and for the purpose specified.

46,299.—Shoes.—Joseph B. Johnson (assignor to himself and Charles Buffune), Lynn, Mass.:

I claim the above-explained improvement in lasting a shoe, the same consisting in the employment of a false inner sole, B, in connection with the last, E, and upper, A, and drawing the upper on the said sole and last by means of thread or sewing, f, or the equivalent thereof, extended across the inner sole, but without going into or through it.

I also claim the combination of two, or any other suitable number of pins and clamps, a b c, or their equivalents, with the false inner sole, B, and for the purpose of holding the main sole in place with respect to the upper, when the latter is confined to the false sole by thread or sewing, f, or its equivalent, going across the false sole, in manner substantially as specified.

I also claim the combination of the spurs, g g, or their equivalents, with the false sole, B, and the upper, A, when lasted as specified, such spurs being for the purpose of maintaining the said upper and the outer sole in their proper relation at or near the ball of the foot.

I also claim the combination of one or more pins, a c, or their equivalents with the false sole, B, and the sewing, f, extended across such sole and about the said pin or pins substantially in manner as herein before explained.

I also claim the arrangement of the inner sole, B, and the sewing, f, by which the outer sole, C, and the upper, A, are united, the said sewing under such arrangement being carried around and outside of the periphery of but not through the inner sole.

46,300.—Combined Rakes and Reels for Harvesters.—Samuel Johnston, (assignor to himself and Rufus L. Howard), Buffalo, N. Y.:

First I claim making an automatic rake and reel combined so that the operator can by means of a lever and cord, and the arrangement of two tracks or ways in which the elbow of the rake moves, cause either rake head to operate at pleasure as a rake and at the same time act continuously as a reel, all constructed in the manner herein described and substantially as and for the purposes set forth.

Second, I claim in an automatic rake and reel combined for harvesting machines, the arrangement whereby the operator without stopping the action of reeling can drop either of the rake heads down to the platform and hold it thereon, while removing the grain therefrom, constructed substantially as described and for the purposes set forth.

Third, I claim the arrangement of the tracks or ways when they are arranged so that in reeling the rake or rake head will drop down nearly to the cutters and move the cut grain back from them and then rise up and pass over the cut grain, substantially as described and for the purposes set forth.

Fourth, I claim the arrangement of the driver's seat in connection with the lever, cord, and gate, substantially as described and for the purposes set forth.

Fifth, I claim in a combined automatic rake and reel, changing the path of the roller which controls the motions of the rake when it is removing the grain from the platform, stbstantialy as described and for the purposes herein set forth.

Sixth, I claim the arrangement of the two tracks or ways in combination with the gates or switches, for the purposes herein set forth.

Seventh, I claim the lever and spring, attached to the forward gate, in connection with the cord for operating the same, for the purposes set forth.

Eighth, I claim the use of the pointed washer attached to the elbow of the rake below the roller for the purposes set forth.

Ninth, I claim the hinged extension attached to the outer end of the rake head applied substantially as described and for the purposes set forth.

And, tenth, I claim the combination of the elbow of the rake head with the roller and the outer and inner tracks or ways, constructed substantially as described and for the purposes set forth.

49,301.—Coffee Roaster and Grain Dryer.—Gilbert D. Jones, (assignor to himself and Charles Place,) New York City:

I claim forming a coffee roaster, of a series of horizontal plates, each arranged to rotate within a closed box, the bottom of which is also horizontal, and which boxes receive and discharge near the center, substantially in the manner set forth herein.

46,302.—Apparatus for Carbureting Air.—Hugh L. McAvoy, (assignor to himself and Elias S. Hutchinson,) Baltimore, Md.:

I claim manufacturing air gas and enriching other gas, by the described mode of using a holder, C, to contain air, receive the carbonaceous matter as it rises from the oil in the form of vapor, and force the gas into the pipe, wherein it is conducted off, as explained.

Second, I claim the plate, E2 employed in connection with the pan, E, to cause the air to pass to the pipe, B, in contact with the oil and in a state of compressure substantially as set forth.

Third, I claim the sealing device consisting of the cup, F, cylinders, G G, and a body of liquid between the latter, substantially as described.

46,303.—Sewing Machine.—James S. McCurdy, Bridgeport, Conn., assignor to Elias Howe, Fairfield, Conn.:

I claim the combination in a sewing machine of the reciprocating needle bar with a double headed rotating hook so formed that when rotated in combination with a reciprocating needle it will draw a loop of needle thread through the two preceding loops, substantially as set forth.

I also claim the combination of the double headed looping hook with the shaft that imparts motion to it by means of two pins which are controlled by a cam the whole operating substantially as set forth.

I also claim the combination of the feeding instrument of the sewing machine with a shaft making one revolution to two descents by the needle carrier through the intervention of two cams of unequal projection, the whole operating substantially as set forth.

I also claim the combination of the feeding instrument with a shaft making one revolution to two descents by the needle carrier through the intervention of two cams and two adjustable wipers, one of said cams having two protuberances of equal projection, and the other having one protuberance of greater projection than those of the other cam, the whole operating substantially as set forth

46,304.—Table Cutlery.—Nathaniel Miles, Buckland, Mass., assignor to "Bay State Hardware Co.," Northampton, Mass.:

First, I claim in table and other cutlery the bolster, C D, formed separately from the tang and having the fastening part, D, narrower than the scale, B, and let into and concealed within the latter substantially as and for the purpose within set forth.

Second, I claim in connection with the above the employment of the hooks or additional parts, E E, adapted to lock the separate bolster pieces to the scales, B B, the whole being concealed within the latter substantially as within set forth.

46,305.—Metallic Window Sash.—Charles Neer, (assignor to the "Architectural Iron Works,") New York City:

I claim a sheet or rolled-metal window sash with sides, 1 2 3, flanged strips, 4, two part meeting rail, B', plug, 9, stiles, A A, and flanged strips or bars, c d, all substantially as herein shown and described.

46,306.—Machine for Washing Wool.—John Petrie Jr., and John Kenworthy, Lancaster, Eng., administrators of the estate of Samuel Taylor, deceased, assignors to Thomas Clegg, North Andover, Mass. Patented in England, July 8, 1853.

What is considered to be new, and therefore claimed as the invention of the said Petrie and Taylor, is the combination of a rotating or reciprocating plunger, c, one or more reciprocating beaters or agitators, e e, and a rotating wheel or drum cylinder or frame, r armed with teeth, prongs or tines, the whole of such parts being applied to a trough and actuated by mechanical means substantially as described.

We also claim the combination of the rotating plunger, c, and the vibrating or reciprocating arms, e, for stirring, agitating and moving forward the wool in the trough.

We further claim in combination with the trough the endless apron, w, or its equivalent, and the squeezing rollers, the lifting drum or frame, r, above shown and described for raising the washed wool out of the water, and depositing it on the traveling endless band or other contrivance for conveying it to the squeezing rollers or some receptacle for receiving it.

We also claim the combination of the squeezing rollers, the lifting wheel, one or more stirrers or agitators, and the plunger, the whole being arranged and applied to a trough substantially as and to operate as specified; and also their combination with the vibrating frame, d, arranged in the trough as described.

46,307.—Spark Arrester.—August Prusman, Lingen, Hanover, assignor to Bernhard Schaffer and Christian Budenberg, New-York City:

I claim the arrangement of the inverted conical tube, F, cylindrical deflector, H, jacket, K, and water tank, I, in combination with the smokestack, E, jacket, C, and exhaust pipe, A, all constructed, applied and operating as and for the purpose herein set forth.

[This invention relates to an improvement in that class of spark arresters in which by a superincumbent tube the products of combustion are separated from the jet of steam and returned to the lower space of the spark arrester, without interfering with the free passage of the jet of steam or with the draught of the smoke stack.]

46,308.—Spark Arrester.—August Prusman, Lingen, Hanover, assignor to Bernard Schaffer and Christian Budenberg, New York City:

I claim a smokestack, A, for locomotives, expanding from the point, a, toward the top and bottom in about the proportion herein specified, and applied in combination with the exhaust pipe, B, in the manner and for the purpose described.

[The object of this invention is to increase the draught created by the action of the exhaust on the column of air in the smokestack o locomotives.]

46,309.—Mode of Compensation for Loss of Motion. Thomas Shaw (assignor to himself and Philip S. Justice), Philadelphia, Pa.:

I claim the combination of spring, k and m, crank wheel, d, and rod, f, when connected with the recording movement, n, in order to operate engine counters requiring a regular measured stroke, in the manner and for the purpose herein described.

46,310.—Paper Shirt Collars.—George K. Snow, Watertown, Mass., assignor to himself, March Brothers, Pierce & Co., Boston, Mass.:

I claim my improved manufacture of paper collar, that is one having on each of its two opposite sides indentations or imprints in imitation of stitching, the whole being substantially as and for the purpose specified.

46,311.—Machine for Making Metallic Tubes.—E. Valentine and M. T. Ridout (assignors to themselves and Wm. Beck), Milwaukee, Wis.:

We claim in combination with a movable mandrel, G, or its equivalent, the hinged sliding jaws, A A, pivoted upon a supporting block or table, B, and operating substantially in the manner and for the purpose herein set forth.

We claim, also, in combination with the jaws, A A, and movable mandrel, G, or its equivalent, securing said jaws by adjustable pivots so as to adapt them to mandrels of different proportions, substantially in the manner herein set forth.

46,312.—Fanning Mill.—Henry W. Veregge (assignor to Benjamin C. White, Marshall Henry, and William Cain, Jr.), Richmond, Ind.:

I claim hanging the slides or shutters of fanning or other similar mills to the frame, or to a piece connected to the frame, by means of a tongue, strip or block on said slides or shutters and a horizontal groove or grooves in the face of said frame or piece, as and for the purpose set forth.

46,313.—Ship's Galley.—William Young, Washington, D. C., assignor to himself, and Chas. F. Stansbury, Philadelphia, Pa.:

I claim, first, The combination and arrangement of the fireplaces, A' B' C' and D', and the oven, E', substantially in the manner and for the purpose specified.

Second, The arrangement and combination of the fireplaces, A' B' C' and D, with the oven, E', substantially in the manner and for the purpose described.

Third, The arrangement and construction of the fireplaces, A' B' C', oven, E', and side recesses, J K L and J' K' L', substantially in the manner set forth.

Fourth, The arrangement in a ship's galley of three or more fireplaces varying in capacity, substantially as and for the purpose described.

46,314.—Machines for Dressing and Finishing Threads, Etc.—Emanuel Burgy, Basle, Switzerland, and Louis Guillemin, Dieboldsheim, France:

We claim the combination of a winding frame, substantially such as herein described, with the bobbins, b, bath, e, wipers, g, and steamchests, h and i, all constructed and operating in the manner and for the purpose substantially as set forth.

[This invention relates to an apparatus which is applicable for the purpose of dressing, finishing, and imparting luster or gloss to all threads or filaments of silk, cotton, flax, and other fibrous substances, but more especially to yarn, thread, or filaments of waste silk or floss silk, which by the use of this apparatus can be rendered equal in appearance to silk, and thereby much enhanced in value.]

46,315.—Hydraulic Apparatus.—Auguste Desgroffe and Achille Ollivier, Paris, France:

We claim the employment or use of a rope, b, or its equivalent, in combination with a box, A, provided with one or more plungers or movable sides, or made of some expansible material, substantially as and for the purposes set forth.

[This invention consists in gradually introducing into a water-tight vessel or box, which is filled with water or other non-compressible liquid and provided with one or more movable sides or fixtures or made expansible, a cord or rope in such a manner that by said rope the liquid in the box, or a portion of the same, is displaced and a powerful pressure is exerted on the sides of the box, which, when movable or expansible, transmit the power thus exerted on their inner surfaces to bodies placed against their outer surfaces, and a powerful pressure can be exerted with comparatively little power and with an apparatus of a simple and cheap construction.]

46,316.—Mode of regulating Motion of Railroad Car Trucks.—Charles Schoubersgky, St. Petersburg, Russia:

I claim the fly-wheels, A A, connected to an axle, B, and supported by the peripheries of the driving wheels of a truck, with or without intermediate friction wheels, substantially as and for the purpose set forth.

[This invention consists in the employment or use of two heavy fly-wheels secured to the ends of an axle which rests, either directly or indirectly, upon the driving wheels of a truck in such a manner that by the action of said fly-wheels the velocity of the truck is rendered uniform and the momentum stored up in said fly-wheels when the truck is going down hill will revert to the locomotive in drawing a train up on an incline.]

RE-ISSUES.

1,861.—Cartridge Box.—Erastus Blakeslee, New Haven, Conn. Patented Dec. 20, 1864 :

I claim a cartridge box constructed in the manner described, to carry one or more movable tubes, each tube containing two or more cartridges, as and for the purpose specified.

1,862.—Supplemental Valves for Steam Engines.—Richard Colburn and L. W. Hanson, Norwich, Conn. Patented May 20, 1856 :

We claim as our invention the combination of an apparatus, substantially as described and for the purposes specified, with the cylinder and piston of a steam engine—such apparatus consisting of the passages, f g, the valve boxes, E E', the valves, K K', their seat passages, h h', and the lever, L', or its equivalent.

We also claim the said apparatus constructed substantially as described and for the purpose or purposes specified.

1,863.—Valve Gear.—Joseph F. Hamilton, Pittsburgh, Pa. Patented July 14, 1863 :

I claim the arrangement of the regulating coupling arms, h, lifters or propeller arms, j k, springs, l, levers, m and n, and link, d, when used in connection with a governor, rock shaft or eccentric of steam engines, the whole being constructed and operating substantially as herein described and for the purpose set forth.

1,864.—Arrangement of Valves for Steam Engines.—Joseph F. Hamilton, Pittsburgh, Pa. Patented July 24, 1860 :

I claim the use of the valve, i, placed in one of the receiving ports of steam engines, as herein described, and for the purpose set forth.

1,855.—Carding Machines.—Lawrence O'Brien, Indianapolis, Ind. Patented Oct. 6, 1863 :

I claim the arrangement of the roll, D, between the main card cylinder, A, and the endless apron, C, substantially as and for the purpose set forth.

Also the construction of the endless apron, C, substantially as herein described, so as to carry the fibers on top of the slats, and dust and other foreign matters between them, the fibers being delivered to the roll, D, and the foreign matters discharged in passing over the upper roll, F, when the same is applied in the manner specified.

1,866.—Keyed Instrument of Music.—Francis Peabody, Salem, Mass.—Patented Nov. 10, 1863 :

I claim as my improvement in mechanism for operating the sound-producing parts of a musical instrument the above-described arrangement of dents, or their equivalents, on a rotary plate, G, viz., in concentric circles, and with the circle of treble and bass dents alternating with respect to one another, substantially as set forth.

And in combination with the said arrangement of dents on a rotary plate, I claim the arrangement of the bass and the treble-key levers, or the parts which produce or aid in producing the musical sounds, in two separate series or sets, whereby those of the bass notes are in one set and those of the treble notes are in the other set, substantially as specified.

And in combination with the keys of a keyed musical instrument, I claim a series of operative key levers and a rotary plate, provided with dents, arranged on its face, as specified.

I also claim the combination of the separate operating wheel, D, and its operative mechanism, substantially as described, with the plate, G, provided with dents, or their mechanical equivalents, arranged as explained.

I also claim the combination of the hinged or elevating frame, M, with the plate, G, and the series of operating levers, C C', or their equivalents.

I also claim the improved speed regulator, composed of one or more adjustable wings, N N', and their stationary surface or wing or wings, and mechanism for varying the position of the adjustable wing or wings relatively to one or more stationary wings, substantially as and for the purpose specified.

I also claim a combination, consisting of the rotary plate, G, with its arrangement of dents, the series of key levers, C C', or their mechanical equivalents, and a mechanism for imparting a rotary motion to the plate, G, the said key levers being applied to the keys and to the dents, by means, and so as to operate therewith, substantially as specified.

1,867.—Paper Collars.—Wm. E. Lockwood, Philadelphia, Pa., assignee by mesne assignment of Walter Hunt. Ante-dated July 24, 1854 :

As a new manufacture, a shirt collar, in which paper is used to imitate starched linen, and which is made of the desired shape by dies or forms applied under pressure.

DESIGNS.

2,028.—Military Belt Hook.—Erastus Blakeslee, New Haven, Conn.

2,029.—Badge or Breastpin.—Michael F. Ryan, New York City.

2,030.—Trade Mark.—Stephen S. Winchester (assignor to E. A. & W. Winchester), Boston, Mass.



PATENTS

GRANTED

FOR SEVENTEEN YEARS.

MUNN & COMPANY,

In connection with the publication of the SCIENTIFIC AMERICAN, have acted as Solicitors and Attorneys for procuring "Letters Patent" for *new inventions* in the United States and in all foreign countries during the past *seventeen years*. Statistics show that nearly ONE-THIRD of all the applications made for patents in the United States are solicited through this office; while nearly THREE-FOURTHS of all the patents taken in foreign countries are procured through the same source. It is almost needless to add that, after *seventeen years'* experience in preparing specifications and drawings for the United States Patent Office, the proprietors of the SCIENTIFIC AMERICAN are perfectly conversant with the preparation of applications in the best manner, and the transaction of all business before the Patent Office; but they take pleasure in presenting the annexed testimonials from the three last ex-Commissioners of Patents.

MESSRS. MUNN & CO.:—I take pleasure in stating that, while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE CAME THROUGH YOUR HANDS. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the office, a marked degree of promptness, skill, and fidelity to the interests of your employers. Yours very truly,

CHAS. MASON.

Judge Mason was succeeded by that eminent patriot and statesman, Hon. Joseph Holt, whose administration of the Patent Office was so distinguished that, upon the death of Gov. Brown, he was appointed to the office of Postmaster-General of the United States. Soon after entering upon his new duties, in March, 1859, he addressed to us the following very gratifying letter.

MESSRS. MUNN & CO.:—It affords me much pleasure to bear testimony to the able and efficient manner in which you discharged your duties as Solicitors of Patents, while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and I doubt not justly deserved) the reputation of energy, marked ability, and uncompromising fidelity in performing your professional engagements.

Very respectfully, your obedient servant, J. HOLT.

Hon. Wm. D. Bishop, late Member of Congress from Connecticut, succeeded Mr. Holt as Commissioner of Patents. Upon resigning the office he wrote to us as follows:

MESSRS. MUNN & CO.:—It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your agency; and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully, your obedient servant,

WM. D BISHOP.

THE EXAMINATION OF INVENTIONS.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a written reply, corresponding with the facts, is promptly sent, free of charge. Address MUNN & CO., No. 37 Park Row, New York.

As an evidence of the confidence reposed in their Agency by inventors throughout the country, Messrs. MUNN & CO. would state that they have acted as agents for more than TWENTY THOUSAND inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of inventors and patentees, at home and abroad. Thousands of inventors for whom they have taken out patents have addressed to them most flattering testimonials for the services rendered them; and the wealth which has inured to the individuals whose patents were secured through this office, and afterwards illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! Messrs. MUNN & CO. would state that they never had a more efficient corps of Draughtsmen and Specification Writers than those employed at present in their extensive offices, and that they are prepared to attend to patent business of all kinds in the quickest time and on the most liberal terms.

PRELIMINARY EXAMINATIONS AT THE PATENT OFFICE.

The service which Messrs. MUNN & CO. render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there; but is an opinion based upon what knowledge they may acquire of a similar invention from the records in their Home Office. But for a fee of $5, accompanied with a model, or drawing and description, they have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a patent, &c., made up and mailed to the inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through the Branch Office of Messrs. MUNN & CO., corner of F and Seventh streets, Washington, by experienced and competent persons. Many thousands of such examinations have been made through this office, and it is a very wise course for every inventor to pursue. Address MUNN & CO., No 37 Park Row, New York.

THE VALIDITY OF PATENTS.

Persons who are about purchasing patent property, or patentees who are about erecting extensive works for manufacturing under their patents, should have their claims examined carefully by competent attorneys, to see if they are not likely to infringe some existing patent, before making large investments. Written opinions on the validity of patents, after careful examination into the facts, can be had for a reasonable remuneration. The price for such services is always settled upon in advance, after knowing the nature of the invention and being informed of the points on which an opinion is solicited. For further particulars address MUNN & CO., No. 37 Park Row, New York.

The Patent Laws, enacted by Congress on the 2d of March, 1861 are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The law abolishes discrimination in fees required of foreigners, excepting natives of such countries as discriminate against citizens of the United States—thus allowing Austrian, French, Belgian, English, Russian, Spanish and all other foreigners, except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms. Foreigners cannot secure their inventions by filing a caveat; to citizens only is this privilege accorded.

CAVEATS.

Persons desiring to file a caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. The Government fee for a caveat is $10. A pamphlet of advice regarding applications for patents and caveats is furnished gratis, on application by mail. Address MUNN & CO., No. 37 Park Row, New York.

REJECTED APPLICATIONS.

Messrs. MUNN & CO. are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of their Washington Agency to the Patent Office affords them rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Their success in the prosecution of rejected cases has been very great. The principal portion of their charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted, are invited to correspond with MUNN & CO., on the subject, giving a brief history of the case, inclosing the official letters, &c.

FOREIGN PATTENS.

Messrs. MUNN & CO., are very extensively engaged in the preparation and securing of patents in the various European countries. For the transaction of this business they have offices at Nos. 66 Chancery lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. They thing they can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through their agency.

Inventors will do well to bear in mind that the English law does no limit the issue of patents to inventors. Any one can take out a patent there.

Circulars of information concerning the proper course to be pursued in obtaining patents in foreign countries through MUNN & CO'S Agency, the requirements of different Government Patent Offices, &c. may be had, gratis, upon application at the principal office, No. 37 Park Row, New York, or any of the branch offices.

HOW TO MAKE AN APPLICATION FOR A PATENT.

Every applicant for a patent must furnish a model of his invention if susceptible of one; or, if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them, and sent, with the Government fees, by express. The express charge should be pre-paid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by a draft on New York, payable to the order of Messrs. MUNN & CO. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park Row New York.

Patents are now granted for SEVENTEEN years, and the Government fee required on filing an application for a patent is $15. Other changes in the fees are also made as follows:—

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

SEARCHES OF THE RECORDS.

Having access to all the official records at Washington, pertaining to the sale and transfer of patents, MESSRS. MUNN & CO., are at all times ready to make examinations as to titles, ownership, or assignments of patents. Fees moderate.

INVITATION TO INVENTORS.

Inventors who come to New York should not fail to pay a visit to the extensive offices of MUNN & CO. They will find a large collection of models (several hundred) of various inventions, which will afford them much interest. The whole establishment is one of great interest to inventors, and is undoubtedly the most spacious and best arranged in the world.

MUNN & CO. wish it to be distinctly understood that they do not speculate or traffic in patents, under any circumstances; but that they devote their whole time and energies to the interests of their clients.

COPIES OF PATENT CLAIMS.

MESSRS. MUNN & CO., having access to all the patents granted since the rebuilding of the Patent Office, after the fire of 1836, can furnish the claims of any patent granted since that date, for $1.

EXTENSION OF PATENTS.

Many valuable patents are annually expiring which might readily be extended, and if extended, might prove the source of wealth to their fortunate possessors. Messrs. MUNN & CO. are persuaded that very many patents are suffered to expire without any effort at extension, owing to want of proper information on the part of the patentees, their relatives or assigns, as to the law and the mode of procedure in order to obtain a renewed grant. Some of the most valuable grants now existing are *extended patents*. Patentees, or, if deceased their heirs, may apply for the extension of patents, but should give ninety days' notice of their intention.

Patents may be extended and preliminary advice obtained, by consulting, or writing to, MUNN & CO., No. 37 Park Row, New York.

ASSIGNMENTS OF PATENTS.

The assignment of patents, and agreements between patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park Row, New York.

UNCLAIMED MODELS.

Parties sending models to this office on which they decide not to apply for Letters Patent and which they wish preserved, will please to order them returned as early as possible. We cannot engage to retain models more than one year after their receipt, owing to their vast accumulation, and our lack of storage room. Parties, therefore, who wish to preserve their models should order them returned within one year after sending them to us, to insure their obtaining them. In case an application has been made for a patent the model is in deposit at the Patent office, and cannot be withdrawn.

It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with patent property or inventions to call at our extensive offices, No. 37 Park Row, New York, where any questions regarding the rights of Patentees, will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid) should be addressed to MUNN & CO. No. 37 Park Row, New York

Notes and Queries

S. J. A., of Vt.—No power is actually gained by either the lever, inclined plane, screw or wedge; what is gained in power is lost in time. This applies to them all equally.

O. M., of Ind.—You have doubtless seen that the true inventor of the Ruhmkorff coil has already been named in our paper.

D. B., of Wis.—The "natural lime" in soil is carbonate of lime, and this would not injure guano. Sulphuric acid, if mixed with guano, would combine with the ammonia to form sulphate of ammonia, and then this would be slowly decomposed during the growth of the plants, yielding the ammonia as it was wanted. Sulphuric acid is destructive to both animal and vegetable compounds, and would require diluting with many times its weight of water to be harmless to vegetation. It is not a fertilizer

C. T., of Mass.—We know of no method by which you can mix elaine oil with water.

J. W. P., of Me.—A sand bath for bluing steel is simply white beach sand, such as is used for scrubbing floors. Place it in an iron pan, over the fire, and heat it hot. The steel must be polished bright, and laid on the sand, when it will gradually acquire a bluish tint. At the right shade take it off and plunge it immediately in cold water. Anything that diffuses the heat evenly will do as well as sand; this material is only used for that purpose.

J. M., of N. Y.—Ede, on steel working, is the book you want. Address D. Appleton & Co., New York City, or go there for it.

G. F., of Mass.—The sample of paper you send is made of cotton.

M. S., of N. Y.—You should use a rotary horse-power, not a treadmill. You will require two horses instead of one.

J. L. H., of Bay City.—You can line up your propeller shaft by taking out the piston and stretching a line through the center of the cylinder, past the crank pin. Turn the crank on each center alternately. If the center of the crank-pin journal coincides with the center of the cylinder the shaft is right. If either end is out, the extreme end of the shaft must be moved to correct it. We cannot give you the information you ask in the space at our disposal.

J. P. S., of Pa.—We do not know the makers of the steam calliope. It was advertised in the SCIENTIFIC AMERICAN many years ago.

H. C. P., of Ill.—The wooden blacking boxes are made by Horace Thayer, No. 36 Beekman street, New York.

C. E. T., of N. Y.—Mercury in expanding will move a piston with a force practically irresistible. All chemical action depends very much upon temperature.

J. G. R., of Nebraska.—You will find tables of the comparative heating powers of various woods in back numbers of the SCIENTIFIC AMERICAN. They have been published many times. H. C. Baird, No. 406 Walnut street, Philadelphia, will furnish you with a work on grinding grain.

Americus.—Machinery for extracting oil from the Palma Christi nut can be had of J. H. Woodgate, No. 182 Greenwich street, New York.

G. W. H., of U. S. N.—We do not know the precise date of the burning of the *Knoxville*. It was about four or six years ago. She had an oscillating engine, built at the Novelty Iron Works.

W. P. B., of Wis.—You could readily make your candle tips as you propose. Whether a patent would pay is for you to determine. Your loss certainly could not be great.

H. D., of Ohio.—We do not believe that there is anything poisonous in the corn cob.

J. M., of Pa.—We do not understand what you mean by removing the coloring property of white lead. It has the power of coloring only white, and this can be destroyed by decomposing the salt.

Money Received

At the Scientific American Office, on account of Patent Office business, from Wednesday, February 1, to Wednesday, February 8, 1865:—

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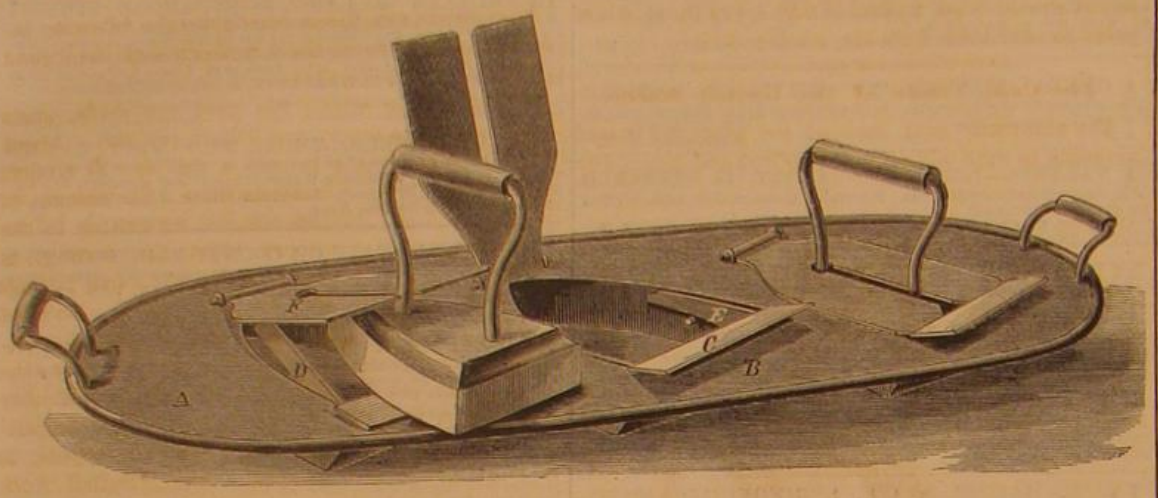
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Improved Sadiron Heater.

This simple utensil is intended to facilitate heating sadirons and economize coal, both of which are perfectly attained by it. Heating irons on the stove or range is a very expensive practice, for a great fire has to be kept up, and a large proportion of the heat is radiated. In summer time this is particularly objectionable, for the fuel is not only wasted but the apartment is rendered exceedingly uncomfortable. The heater shown herewith is a capital thing for the purpose and should be found in every family. The heater sits in the stove, as usual, and has recesses or pockets, A, in which the irons are placed. These recesses are covered so that the iron is really in a pocket, exposed to the heat, but protected from



BLEYER'S SADIRON HEATER.

the air. The handles are also kept cool, or at least at a much lower temperature than when this heater is not used. The pockets can be removed separately when burned out, provision being made for that object.

By looking on the engraving at B, a metallic plate, C, will be observed. When the iron is to be entered, this plate tips up, as shown at D; the iron being set on it throws the back arms, E, up, as shown in the figure of the iron, thus raising the cover, F, and allowing the iron to be put in place. By merely setting the iron on the plate, C, therefore, the cover opens and the iron may be put in the recess without using any instrument or lifter to raise the covers. This ingenious device cannot get out of order, and is so simple that the most stupid servant cannot misunderstand it. It was patented through the Scientific American Patent Agency, on the 18th of Oct., 1864, by Henry W. Bleyer; for further information address him at 380 Michigan street, Buffalo, N. Y.

Meteoric Rain.

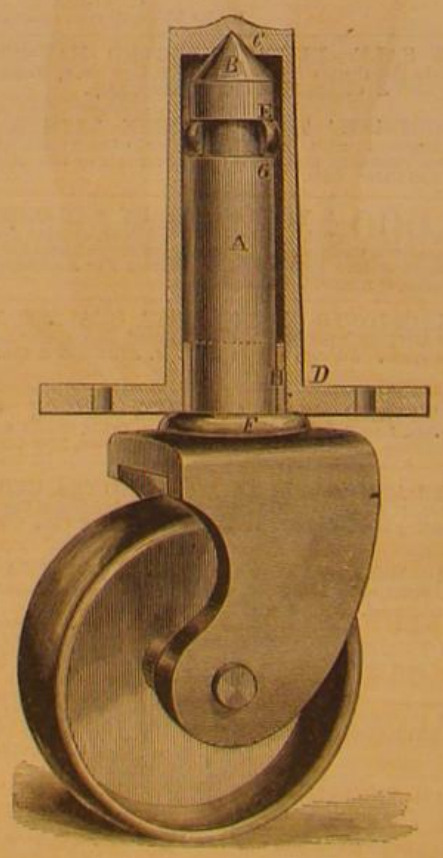
The Paris correspondent of the *Chemical News* states that a curious experiment has been made by Dr. Reichenbach, of Vienna. He believes in the existence of a cosmical powder or dust which exists all through space, and which sometimes becomes agglomerated so as to form large and small meteorites, while, at other times, it reaches the surface of our earth in the form of impalpable powder. We know that meteorites are mainly composed of nickel, cobalt, iron, phosphorus, etc. Dr. Reichenbach went to the top of a mountain which had never been touched by spade or pickax, and collected there some dust, which he analyzed, and found it to contain nickel, and cobalt, and phosphorus, and magnesia. People have wondered where the minute quantity of phosphorus so generally distributed on the surface of the earth came from. The doctor, however, has discovered it in this mysterious invisible rain, which henceforth must be looked upon as quite as necessary for vegetation as the water which falls from the clouds.

Still Thinner Iron.

The *Birmingham Daily Post* says: "The 'thinnest sheet of iron yet rolled in the world,' has elicited numerous competitors in this country, and has at last been signally beaten. The sheet in question was the 1,000th part of an inch in thickness. The other day we mentioned that iron had been rolled at Cardiff considerably thinner, and since then some iron still thinner, rolled by Messrs. James, of Bilston, has been shown to us by Mr. Brinton, of Great Charles-street, in this town. Yesterday two other samples came to hand. One of them, rolled from common iron in the ordinary sheet mills, by Messrs. Robert Williams and Co, of Swan Village, Westbromwich, is 1,015th part of an inch thick, is very tough, and has a very good even surface. The other specimen, which at present bears away the palm, consists of two sheets, measuring 8in. by 5½in., weighing respectively 49 and 49½ grains, and being the 1,400th part of an inch in thickness! These marvellous examples of iron rolling were produced by Messrs. Nevill, Everitt, and Co., of the Marshfield Ironworks, Llanelly. The Messes. Everitt, of Kingston Works, in this town, are partners in this firm; and therefore, a Birmingham house may finally claim the credit at first taken by our ironworker at Pittsburg, the Birmingham of the United States. It should be added that one of the specimens sent us by Messrs. Nevill and Everitt, is beautifully finished; the other is left just as it came from the rolls, not having been annealed."

RILEY'S CASTER.

The object of this invention is to procure a strong, durable and easy-working caster for pianos, chairs, tables, and other furniture. It resists any lateral strain to which it may be subjected in moving the furniture, and at the same time conforms easily to the direction in which the table or chair is to be moved.



The engraving published herewith is a section of the tube and an elevation of the roller; the section shows the details of the improved portion. The shank, A, of the caster has a pointed end, B, which fits in a center, C, in the tube or socket, D. This center sustains the weight of the piece of furniture, and the collar, E, below, has little or no friction upon it, thus allowing the roller to conform to any direction with great facility. The upper part of the shank has a recess, F, in it which carries a spring, G; this spring is larger than the tube and collapses or closes when the shank is pushed on to its place, thus while the shank can revolve in the tube it will not slip out when the article to which it is secured is lifted off the floor. There is in addition a loose collar, H, which steadies the lower portion of the shank and renders it at all times easy working. The caster proper may be pulled out of its socket and oiled, if necessary, in a moment, and reinserted when necessary. In other respects this is a strong and well made caster, and one likely to give good satisfaction. A patent was procured on it through the Scientific American Patent Agency, on the 25th of November, 1864, by J. M. Riley, of Newark, N. J. For further information address Riley & Smith, No. 30 North Broad street, Newark, N. J.

THE graceful and self-teaching system of Babbittonian Penmanship, which we commended in this journal two weeks ago, is now published by Babbitt & Wilt, at No. 37 Park Row, New York. Terms (post paid) $1·50.

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Vol. XII.---No. 9. (NEW SERIES.) NEW YORK, FEBRUARY 25, 1865. $3 PER ANNUM (IN ADVANCE.)

Improved Foot Bellows.

This isolated and mysterious-looking individual is an illustration of the ease with which two things can be done at the same time, if we only have the proper tools. In blowing forge fires by the old-fashioned bellows, one hand rests on the pole continually, and is always occupied, so that to replenish the fire, or do any little office that requires special attention, the blast must stop and time be lost thereby. Not only is this the fact, but the common bellows require muscle to operate them all day; whereas the weight of the workman does the business in these, leaving both hands free to perform any duty they may find to do. In the illustration the bellows are shown set end to end on a platform, and connected by a strap, so that when one is in a state of collapse the other is full, thereby a continuous current is kept up at all times. The action of this apparatus is carried on by simply rocking the body from side to side, thus throwing the weight off from one foot on to the other. For very many purposes it will be found a useful substitute for the old mode of operating bellows.

Patented through the Scientific American Patent Agency, on the 25th of October, 1854, by Henry Neumeyer, whom address at Macungie, Lehigh Co., Pa, for further information.



NEUMEYER'S FOOT BELLOWS.

Vaccination from the Cow.

At Naples they vaccinate directly from the cow. The subject has been seriously taken up in Paris, and it is estimated that a good commercial speculation can be made of it. A cow, it is said, will produce 100 pustules, which, at 5 francs each, will bring 500 francs, the cow suffering no deterioration in value. The practice is greatly recommended by the safety it ensures that no other contagion will be communicated along with the cowpox. Smallpox is rather prevalent in and around Paris, and people are becoming anxious on the subject. It is recommended here that the cow should be vaccinated by twelve or fifteen small punctures around the vulva, a part the animal cannot get at. The pustules ripen about the 8th or 12th day. The lymph is too thick to put in tubes, but must be taken on glass plates, which can be moistened when the matter is wanted. A good idea has been started by one doctor, namely, that it will be just as well to drink the milk of an infected cow as to get vaccinated. The doctor has made the experiment. He vaccinated a cow on the udder and got two good pustules. He then gave the milk to two infants, and afterwards tried to vaccinate them, but without success, while a third infant who had had none of the milk was at once inoculated by the same virus. He recommends that young ladies who are afraid of a prick with a lancet should drink a glass of milk every three or four years to save them from the small-pox!!

The Coal Trade of the United States.

The anthracite coal trade of the year just passed amounts to nine million nine hundred and ninety-two thousand eight hundred and seven tuns, an increase of five hundred and fifty-seven thousand six hundred and twenty-four tuns. With the bituminous coal the total amount is eleven million seven hundred and forty-one thousand one hundred and thirty-nine tuns. The increase of domestic coal is six hundred and thirty thousand tuns. The decrease in foreign coal was four hundred and ninety thousand one hundred and sixty-seven tuns. The colliery capacity of the different regions is ample to supply all the coal the market will require. Miners and laborers are more abundant. The supply of coal in 1865 will depend altogether on the transporting capacity to convey it to market.—*Pottsville Mining Journal.*

The Manufacture of Cast-iron Guns.

The Pittsburgh *Commercial* gives the following information concerning the manufacture of large guns at the Fort Pitt Works:—

"The iron of which the guns are made, costs from ninety to ninety-five dollars per tun. About five per cent of this is lost in the form of cinders and impurities. The amount of coal required for melting to the proper point for casting, is about twelve and a half bushels to each ton of metal. No blast is used in melting metal for casting cannon, by which means the admixture of sulphur and other impurities, inevitable in smelting with coke in a cupola, is avoided. The principal work now done here is the making of 8-inch, 10-inch and 15-inch Columbiads, for both army and navy use, and 32-pounder guns for the latter. These differ, in that a great proportion of the weight in a navy gun is behind the trunnions, and that it is supplied with a breech-screw, while the army Columbiad is accurately balanced on its trunnions. Some rifled guns have been made here, but not many. In making them the practice is to cast them in molds one size above their caliber, as, for instance, an 8-inch rifle is cast in a 10-inch mold. All the lifting of these huge masses of iron is done by cranes built by Mr. Jos. Kaye. These cranes are in themselves wonders. One which is worked by a toy-like engine, having but a five inch cylinder and one foot stroke, multiplies its power in the ratio of 1000 to 1, and lifts and moves about in any direction with the most perfect ease a weight of thirty-eight tuns, effecting inconceivable economy of labor.

The facilities of this immense establishment, with its four furnaces, fourteen casting pits, twenty-six finishing lathes, and one hundred and eighty skilled and intelligent workmen, are such that it can turn out weekly, two 15-inch, eight 10-inch, and four 8-inch Columbiads; besides one or two 31-pounders for navy use.

The American Automatic Stop Motion Company, whose several inventions were illustrated in No. 7, current volume of the Scientific American, requests us to announce that State rights are for sale on application to the company, at Newburyport, Mass.

It is said that many lives were saved at the recent Philadelphia fire by the device of pelting the upper windows of tenements with snow-balls, which, breaking the glass, awakened the inmates in time to make their escape, which a few moments delay would have rendered impossible.

REMARKS ON THE SUBJECT OF FORCE IN GENERAL.

BY JOHN A. ROEBLING.

[For the Scientific American.]

[Continued from page 115.

Matter is governed by the principles of heat, light, etc., and it at the same time owes its origin to these principles. It is these very principles which constitute the qualities and properties of matter. Remove all qualities and properties from matter, and nothing remains. All matter is an incorporation of force. Dr. Dalton's idea that the properties of matter are fixed and permanently lodged in infinitely small atoms, is too unphilosophical to be variously entertained any longer. It is this imaginary hypothesis which forms the great bulwark of the material philosophy. No end can be assigned to the divisibility of matter. In its minutest atoms matter remains an incorporation of force, and when we, in our imagination, carry division to infinity, we at last arrive at the mathematical point, which is the true center of force. From this imaginary point, this geometrical center the spiritual principle takes its start; space is occupied, time is consumed, and the material is born.

The difference between mechanical mixtures and chemical combinations is, that in the former the component parts do not loose their qualities or properties in themselves; they preserve their identity. In a mixture of salt and water, water remains water, and salt remains salt. But in a chemical composition the component parts lose their individual identities and they jointly form a new body, with new properties or qualities. In the chemical composition the various component parts, *as such, do not longer exist.* For instance, 8lbs. of oxygen and 1lb. of hydrogen form 9lbs. of water. Now water is an entirely new body, totally different and distinct from either oxygen or hydrogen. Neither the one nor the other exists in water. Oxygen is a certain incorporation of force, so is hydrogen. Combined in certain chemical proportions, a new incorporation of force has been evolved, and this has no direct relationships to those from which it sprang. The process of nature, when examined through a material eye alone, is unintelligible, and finds no echo in the human soul. But when scrutinized with a spiritual eye, the whole process becomes spiritual; we are no longer dead atoms moving about according to law, but we see the law itself, the principle, assuming shape and form.

Mechanical action proceeds from an outside impulse and is simply communicated. Dynamical motion originates from an inner cause, but the first impulse toward that inner process is also imparted from the outside. There is no process in nature which is self generating and self existing.

Molecular action proceeds from the center outward. The molecular condition of matter is not only quantitative but also qualitative; it is an inner state, an inner affection, not only an aggregation. When the caloric affections of two contiguous molecules are disturbed in their relative intensity, then their mutual endeavor is to restore the lost equilibrium. This endeavor produces the sensation of heat.

An increase of heat causes expansion, a decrease produces contraction of the particles of matter. This expansion and contraction proceeds as far as the molecular structure of the body permits. The affection of matter for heat is fixed within the range of 32° to 212° Fahrenheit. Nor is its rate of contraction and expansion perfectly uniform within those limits. It appears that the maximum density of water corresponds to 40° and not to 32°. It is probably owing to this provision, that the water of the ocean, even at the greatest depth, and under the greatest pressure never solidifies. At a depth of 10 miles the pressure is over 23,000 lbs. per square inch, enough to force water through any kind of metal, yet at this depth it remains flu'd. In order to freeze, water must expand, which it cannot do owing to the great pressure. Above and below 40° water expands. At 32° it forms into ice, at 212° it forms steam. To convert water of 32° into ice of the same temperature, 142° of heat must be abstracted, and the loss of heat cannot be discovered by the thermometer. *Vice versa*, if ice is to be converted into water, the same amount of heat must be absorbed. In the old language these 142° of heat have become *latent*, because they are insensible to the thermometer. The conversion of ice into water consumes an expenditure of expansive force, equivalent to 142° of heat; and because this expansive energy is appropriated, incorporated by the molecules of ice, *therefore* has it become insensible to the thermometer. So long as ice remains ice, an increase or decrease of its specific temperature or heat may be discerned by the thermometer, because in that condition ice is simply a receptacle or conductor of heat, and any want of equilibrium between the ice and the mercury of the thermometer will at once be indicated by the latter, either by its contraction or expansion. The same with water between 32° and 212°. So long as it remains water, heat will only affect it specifically like any other conductor.

Heat is an expansive power. Remove this principle from matter entirely, if such were possible, and it would shrink to an absolute nothing. On the contrary, an infinite increase of heat would expand matter infinitely. It is owing to the presence of the caloric principle in matter, in certain fixed ratios, that it has a natural or outward existence. A comparative small degree of caloric principle in the form of latent heat constitutes solid matter; an increased quantity of that same energy will change the solid state to a liquid; and a still higher degree will convert it into vapor.

There is no essential difference between latent heat and specific. Latent heat is simply absorbed or incorporated heat; specific heat, on the other hand, is free heat; that is free to act, to expand or contract. *Free* and *incorporated* heat would be more significant terms. When ice of 32° absorbs 142° of caloric, it becomes water, and this amount of expansive energy is incorporated for the purpose of keeping the molecules of water apart, and to prevent them from congealing into a solid mass. The static condition of the molecules of water is neutral; there is perfect equilibrium between them; they neither adhere to each other, nor have they any disposition to fly apart. It requires 142° of incorporated heat or expansive energy, to maintain this fluidity. All matter has a centralizing contracting tendency. All matter wants to go to the center, hence the force of gravitation and aggregation. The whole universe would collapse into one single point, if it was not for the expansive power of heat and the centrifugal tendency in cosmic motions.

From 32° to 212° the molecular structure of water undergoes no change; it only serves as a conductor for specific heat within those limits. But on absorbing more expansive energy its molecular condition is suddenly changed, and the atoms of water fly apart. Water in fact ceases to be water, it is converted into vapor or steam. The boiling point of water or any other fluid depends upon the pressure of the atmosphere, or the vapor, which rests upon its surface. This superincumbent pressure determines the rate of expansive force required to release the fluid molecules from their equilibrated condition, and to cause them to expand. The pressure of one atmosphere allows water to boil at 212°. Under a pressure of two atmospheres 250° are needed; under four atmospheres 292°, etc. As the superincumbent pressure increases more expansive force must be expended to overcome it.

One cubic inch of boiling water of 212°, when converted into saturated steam, will have expanded 1700 times. Saturated steam of a given temperature can only attain a certain density and pressure, neither more nor less, because it is its caloric condition or state which determines its density and also its pressure and elasticity. Expansive action is governed by this simple fact.

More than 1000° of heat are absorbed by water of 212° before it assumes the form of vapor or steam under the pressure of one atmosphere. Now this large amount of caloric energy is needed to overcome the molecular tendency of the fluid state, and therefore it becomes truly incorporated, because it is not the water alone which forms the steam, but the water and heat combined. In steam there is no water, properly speaking. Steam is vapor, not composed of small particles of water, but entirely destitute of all water. Water is only a material form. The expansive energy of heat takes hold of this form for the purpose of expanding, and when expanded, the form of water is gone; it no longer exists as water, it has become steam, which is essentially different from water. Water no longer exists in pure steam in the form of expanded bubbles or minute globes, but these globes have absolutely been reduced to mathematical points, centers of expansion. In steam water has become a simple vehicle of expansive energy, and in this new form of matter the fluid has lost its former identity.

All forces result from matter in motion. Matter at rest is neither force nor motion. Matter destitute of natural qualities and properties, is reduced to the simple material, the ponderable substance. But we know that all qualities and properties are incorporated forces. And since we know of no matter without qualities or properties, we conclude there is no matter at rest dynamically. When our senses are affected, our eye, ear, smell, taste, feeling, we know this affection results from impressions caused by forces, that is matter in motion. Matter is constantly affected by these forces or energies, which constitute its life, that is, its qualities and properties. Abstract these energies from matter and nothing is left but the abstract substance without any quality and property. What matter is and appears is consequently owing to those energies, by which it is affected.

Matter at rest is neither force nor motion. The simple ponderable substance being a *constant* element, force therefore resolves itself simply into motion. A force at rest is a force without motion, which is no force at all. A force at rest is at rest because it is balanced by some other force or by its own reaction. A rock at rest, that is supported by a secure foundation, produces pressure, but this pressure is no force without motion. The simple pressure is balanced by the reaction of the foundation, but at the same time this pressure is felt through the whole earth.

The elasticity of steam confined within a boiler and at rest is a force at rest, producing simple pressure, which is met by the resistance or coherence of the iron. The tension of a piano string is equilibrated by the pins and the iron plate in which they are fastened. The expansive tendency of the string or of steam are balanced by other energies, and thus being at rest no force results. Force is produced only when this equilibrium is disturbed and when motions take place. This is equally true of pressure, tension, dynamical and chemical conditions. All motions are the result of disturbed equilibrium. A disturbance in the balance of dynamical affections produces motion. But this proposition may also be reversed; motion is the cause of all disturbance. There is no difference between motion and energy; they are identical. Motion arrested produces rest. So does energy, when arrested or balanced by some other energy. But energy arrested is not lost; it continues to exist as tension or pressure, suppressed affection or feeling.

[To be continued.

DRY PRINTING OF FRACTIONAL CURRENCY.

In No. 5 of current volume, under the head of Editorial Correspondence, you allude to the dry-printing process as now carried on in the Treasury Department. You say:—"The question of dry printing by hydrostatic pressure, to which reference is made on page 294 of our last volume, is practically settled; some eighty presses are printing fractional currency, and it is done more rapidly, we think, then by the process of wet printing. There is less manipulation required, while the work is finished in a superior manner."

My business being such as to frequently bring me in contact with printers, I have obtained reliable information on the subject of this dry printing as now carried on in the Treasury, which leads me to believe that your opinion is based more on representations than on personal observations, which your limited time did not probably allow you to make It is true, printing can be done by hydrostatic pressure, but the work is not to be compared in finish to that done by hand on the old style presses—being blurred and uneven in appearance; the immense pressure required proves quite detrimental to the plates, paper, and the packing on the upper surface of the press; the unevenness of the printing is particularly noticeable on the edges of the sheets. As

to the question of speed, notwithstanding all the bright anticipations of the projectors of this plan, experience has proved that it cannot be realized. Even at the present moment, when the machinery—after being remodeled a number of times—is supposed to be perfect, as asserted by the Hon. Mr. Garfield, more than four to five hundred impressions cannot be taken in a day with two presses, two men and a boy; while on the hand press, by the wet process, the average is eight hundred to one thousand a day, with one press, one man and a girl. It is also a well-known fact that the machinery is very expensive, and very difficult to construct so as to resist the immense hydrostatic pressure required. Quite a number of presses have been cracked, and are cracking every day, in consequence of such pressure. Any one may ascertain the truth of this assertion by visiting the grounds around the Treasury, where he will see quite a number of those presses broken to pieces. The machinery for this process of printing is quite complicated, requiring steam power, pipes of immense strength to convey the oil to the receiver, and the receiver itself. This unfortunate piece of machinery is quite liable to damage, owing to the very difficult task it is expected to perform. Several of them have been broken; and I predict that, should a large number of presses be worked together, it will be almost impossible to build one strong enough. I will give my reasons for the assertion. The receiver is a cylinder with a piston in it, somewhat in the style of a steam engine; to the piston rod an immense weight is attached to maintain the proper pressure. Into this receiver the oil is forced by steam from the lower story, and, as the pressure and the volume of oil increase, the piston is pushed to one end, thereby taking up the weight attached to the piston rod; all the presses draw their supply of force from the receiver. We will now suppose an impression being taken; the tender opens the cock in connection with the receiver; a certain amount of oil forces the plunger of the press; this necessarily lessens the volume of oil in the receiver, and causes the large weight at the end of the piston rod to fall a certain distance to take up the loss of oil; when the pressure is again equalized, the weight stops suddenly, which causes quite a jarring by the destruction of the momentum acquired in descending. But instead of one press being worked, let us suppose that ten or fifteen are worked, all opening their cocks at the same time; the large weight, instead of falling a few inches, will fall a much greater distance, and, when the presses are all full, will stop with a much greater jarring, according to the laws of gravitation, showing the velocity to increase very rapidly according to the distance traveled. I am certain no metal known would resist the shock given by the stoppage of such a momentum. This will be the inevitable result whenever several presses are worked together. Until now, assertions to the contrary, but four presses have yet been worked together; enough of them, however, to prove my position to be true, as the broken receivers attest for themselves. This dry printing process is also dangerous, as one of those presses bursting under such an immense pressure may cause much damage—even death. Quite an accident happened some time since to one of the employees from such a cause. He noticed the oil spirting from a crack in one of the presses, and so as to prevent it from soiling the place he put his hand to the crack with a handful of cotton waste; the oil being driven with the immense pressure required went right through his hand, and made quite a bad wound. It is well known among the employees of the printing department of the Treasury that this system has proved to be a failure, and a useless experiment at a great cost to the Government; and why in these times of great financial difficulties this experiment is allowed to continue is incomprehensible. It would seem that the amount of money wasted on this experiment could be spent with much more favorable result by providing for the wants of our sick and wounded soldiers. Persons trying to foster such a costly experiment, at this time more than any other, ought to be punished. Should the worthy Secretary of the Treasury have this system of printing inquired into by competent practical printers, I have no doubt that the conclusions would warrant him in preventing further expenditure of money on this worse than useless process. I also wish to call your attention to another branch of the printing department—bronzing. This is said to be security against counterfeiting—in what manner I am unable to say; but it seems to me that the bronzing process is well known to all printers of ornamental show cards, and is nothing new; it is, also, quite an unhealthy process, and should be discontinued. Yellow ink would answer as well, if the yellow must be retained. Another branch—the manufacture of the "filament paper," as it is called, introduced at the commencement of the printing of the fractional currency—has proved itself to be anything but what it was represented to be, and the use of it is now discontinued. In a word, it is a fact that our currency printing department is anything but what it should be; and it seems strange that, with the resources our Government possesses, we have not attained a higher degree of security against counterfeiting. I may also say, by the way, that the article published in the last volume, page 114, contains several errors in regard to dry printing, and must have been written by a person wholly unacquainted with the business.

PRINTER.

[The old question presents itself—"Who shall decide when doctors disagree?" We think the force of our correspondent's communication is somewhat lessened by its denunciatory character which is often made to supply the lack of argument. Our visit to the currency bureau was necessarily somewhat hurried; but, nevertheless, we paid pretty close attention to the wet and dry processes of printing as practiced in the bureau. It is possible that the novelty of the dry process, influenced our opinion, as we are always pleased to witness new processes, and to encourage such whenever we discover merit in them. We have no partiality for any man's pets, and we usually distrust all schemes that savor of a selfish adherence to one's own notions to the exclusion of all others. In the report of the superintendent of the Bureau, he remarks :—

"Experience proves that impressions can be taken as fast as the plates can be inked and put in the press (the process of inking being the same as for wet printing), and this is the only limit to the rapidity of their execution; while every impression is not only perfect in itself, but each is likewise an *exact* counterpart of the original—a result impossiblo by any wet printing. During the last two months not a single imperfect impression has been produced on any one of the dry presses now in use; while by the wet process the product of imperfect impressions is daily reckoned by hundreds. The work of both wet and dry printing is done by journeymen for what are technically termed "piece prices"—that is, a given price per thousand sheets for the number of impressions printed. The piece prices paid for dry printing are nearly twenty per cent less than for wet printing; and when the operatives become expert, it is expected that the entire cost, including wages of valve-tenders and feeders, will be less than the cost of wet printing."

Ex-Secretary Chase indorses the dry process, and the House Committee, of which Gen. Garfield is chairman, also indorses it. Here is reliable testimony which ought at least to mitigate severity of judgment; for it cannot be supposed that these distinguished men would willingly indorse any system that tended to waste the public funds, which our correspondent thinks ought to be used in "providing for the wants of our sick and wounded soldiers."

It appears also, from the report from which we have quoted, that certain influences have combined to prove that the conduct of the superintendent of the bureau had well nigh converted the United States Treasury Department "into a house of orgies and bacchanals." After a careful investigation by Congress he came out of the trial thoroughly vindicated, and his system was indorsed.

We do not know the superintendent who has thus escaped, but we cannot commend a continuance of such attacks as have been made upon his character and fidelity. The system of dry printing is in a fair way to be thoroughly tested, and we do not see either the wisdom or justice of denouncing it until the experiment shall have been completed.

THE Waltham Watch Company manufactures a watch every four minutes of a working day.

Valuable Practical Recipes.

We extract the following recipes from the *Chemist's and Druggist's Circular:*—

To restore Tainted Meat.—If salted, wash it and throw away the brine, then replace it with the following composition, and allow it to remain in it for a few days: Fresh burnt charcoal, powdered, 12 parts; common salt, 11 parts; saltpetre, 4 parts. Mix. This is to be used the same as common salt. When the meat is to be cooked the black color may be removed with clean water.

To Whiten Tallow.—Melt the tallow and add a little alum and saltpeter, or a little nitric or sulphuric acid.

Bandoline (Rose).—Take Tragacanth, 6 ounces; Rose water, 1 gallon; Mix, and after standing two days strain, and add otto of roses to perfume. May be colored with a little cochineal. The almond bandoline may be made by substituting the oil of bitter almonds for the otto of rose.

Camphor Ice for Chapped Hands.—Melt spermaceti, one drachm, with almond oil, one ounce; and add powdered camphor, one drachm. It will be improved by adding a couple of drachms of glycerine, using as much less of the almond oil.

Water-Proof dressing for Shoes. 1. Take oil, 5 ounces; wax, ½ ounce; Burgundy pitch, ¼ ounce; oil of turpentine, ½ ounce; melt together and apply until the leather is saturated.

2. Suet, rosin, and beeswax melted and applied.

3. A solution of India-rubber, 2 drachms.

To detect Inks.- To distinguish writing made with nutgall-ink from that of logwood-ink proceed thus: Immerse the written paper for some seconds in water acidulated with nitric acid (say 6 to 8 drops of nitric acid to an ounce of water); the logwood-ink will assume a yellow-red color and afterwards disappear entirely, while the nutgall-ink will remain unchanged.

Liquid Blue—Prussian blue (pure, in fine powder), 1 ounce, is placed in a small matrass or common vial, and concentrated hydrochloric acid, 2 oz., poured on it. Effervescence ensues, and the mixture soon assumes the consistence of a thin paste. After about 24 hours, it may be diluted with 8 or 9 oz of water, and preserved in a glass bottle. The intensity of this color may be lessened by over-doses of water. If the whole be poured into one quart of water, it will still exhibit a color sufficient for washing prints.

How French Ladies Bathe.

At the trades exhibition in Paris, the pretty things are plentiful, and the collection includes one or two amusing inventions. Foremost among these is a superb car, drawn by silver swans of gigantic proportions. The car is intended for fair bathers. In its fairy network they may recline at their ease, and float upon the waters, and in the waters, buoyed up by the four gallant silver swans, who will bear them safely upon the gentle swell of summer seas. At the fair bather's elbow is a handle that works a screw, and by this screw she may drive her car and her swans at her own sweet will. This is luxury enough, one would imagine, for even a Parisian countess, at Biarritz or Trouville. But the inventor is not satisfied. He knows the ladies for whom he caters; and in the backs of the noble birds he has contrived a liquor-case too.

Wanted, a better Plow, and a better Reaper and Mower.

A correspondent of the *Prairie Farmer* writes to that journal as follows:—

"We farmers want, in the first place, a better plow than we have yet been furnished. We want one that will scour perfectly, and one that will not let any dirt fall in on the land side, nor over the mold board into the furrow; and last, but not least, we want a plow that will not catch drift under any circumstances. Any man who can get up a plow of this description, will be a national benefactor. Next, we want a combined reaper and mower that will cut as low as one inch, and as high as twenty-six. We want the straw of our grain, if we choose, left on the ground where it belongs; and also want to shave our meadows clean if we like. From all I can see and learn, it is much easier to make a machine that cuts neither high nor low, than any other."

POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

The Association held its regular weekly meeting at its room at the Cooper Institute, on Thursday evening Feb. 9, 1865, the President, S. D. Tillman, Esq. in the chair.

HATFIELD'S ROLLER SHEAVES.

Mr. Stetson exhibited a model of Hatfield's sheaves for the rollers of sliding doors, the same that was illustrated on page 70, current volume of the SCIENTIFIC AMERICAN.

TWIST DRILLS.

Mr. Watson brought to the notice of the Association some very beautiful samples of twist drills used by machinists in boring holes in metals, and in alluding to them said :—

"The perfection to which we have attained in metal-working is one of the miracles of modern times. In all of our large machine shops iron is planed and turned in large masses with a speed and accuracy unknown in former times. I have here one of the modern tools used for working metal which is, as may be seen, not only externally beautiful, but constructed on sound principles. I have here also a common flat drill, such as is ordinarily used, and I deem it unnecessary to more than to show you the two, side by side. The advantages resulting from the use of such drills as this twisted one, are, that the work can be done in less than half the time. To say nothing of the first cost of the two tools—which is largely in favor of the twisted drill—it commends itself to mechanics by reason of its perfect accuracy in all that affects size, uniformity of quality and temper. These are standard tools, and as such have a very great value even beyond their intrinsic worth. When I say *standard* I wish to convey the impression that they are all alike. A hole drilled by a thirteen-thirty-second drill to-day, will be the same as one drilled last year by any other drill of that size from the same factory, so that work which is laid off and executed by them can be reconstructed in case of breakage with the certainty that the bolts or other fixtures belonging to the job will fit. Beyond this mechanical advantage there is the very great additional moral one of having in daily use tools that are calculated to excite emulation and stimulate mechanics to do good work instead of poor.

"These drills are of all sizes, from three-eighths, varying by thirty-seconds of an inch up to one inch and a quarter, with turned taper shanks and sockets to match and with straight shanks, made of Stubb's wire, from three-eighths down to a sixty-fourth of an inch, or from No. 1 wire to No. 60 wire.

"I can easily conceive what an immense advantage these drills will be to all metal-workers. I have always thought that twist drills should be sold in the stores as cheaply as augers for carpenters; and when I speak of the price it is almost incredible to see how they can be sold for it. Why, sirs, this splendid inch-and-a-quarter drill, turned from end to end with a taper shank, accurately ground and tempered, sold ready to drill a hole with on the spot, costs but five dollars. No man could go to work and make one like it for three times the money. The four sockets cost but $10. I know something of metal-working, and these tools could not be afforded at any thing like the sum, unless the company worked upon a regular system and had ingenious machines constructed for this very purpose.

"It was not my intention, when I came here, to occupy too much time in the discussion of this tool, but I have felt it important to metal-workers that the fact of such drills as these being offered at such moderate prices should be made known. The Manhattan Fire-arms Company of Newark, N. J., the manufacturers, spared no pains or expense to make a perfect tool, and I would advise every one interested in metal-working to send for samples.

"The best fine tools we have in this country are not made here but abroad. I mean by this, small rimmers, screw-plates, and similar wares, and I think that, as members of this Association, we should take pains to make the facts I have stated previously, widely known."

Mr. Arnold, the inventor of machinery for making this drill, was present and gave some interesting information as to the manufacture of the tool.

Capt. Maynard—I should like to have the inventor state how he tempers the drills. Does he mean to say that he does not lose any of them, and that they do not buckle or twist in hardening.

Mr. Arnold—I can answer that question by saying that we harden them by plunging the shank end in the water first and draw the temper afterward to the right color. The taper on the length of the drill, 12 inches, is barely the sixty-fourth of an inch and we rarely find any so bent that they are useless; a little deviation can easily be corrected by a hammer. Mr. Arnold stated that the drills were never touched by a hammer to be forged from the time the steel was drawn, and was therefore homogeneous throughout.

[As we expect to present our readers with engravings of these drills shortly we forbear further allusion to them.—EDS.]

TELEGRAPHS.

The regular subject for the evening being telegraphs, Mr. Stetson made some remarks on the subject, in the course of which he stated that dispatches have been sent through wires connected in one line of 1,700 miles, mostly submerged in the Mediterranean.

Dr. Stevens expressed the opinion that the destruction of the Atlantic telegraph is simply a question of time. There are scavengers in the sea, animals that will eat every kind of vegetable matter, and the hemp and gutta percha used in the construction of the cable must sooner or later be destroyed. But the overland route by the way of Behring's Straits, will doubtless prove a success. Extending in a northwest direction from the Red River of the North there is a route entirely across the British Possessions, which is free from mountain ranges, broad rivers, and all other serious obstructions. It is inhabited by half-breed Indians who have been trained to labor by the Fur Company, and who will be glad to put up the line and keep it in order. By this route a line of telegraph can be constructed from New York city to the Russian Possessions without encountering a single mountain in the whole distance.

Twin Screws and their Engines.

We make the following extracts from the London *Engineer* of January 20th:—

"It is well known that a particular proportion of pitch to diameter of screw, say, about $1\frac{1}{4}$ to 1, has been found to answer better than either coarser or finer pitches. As twin screws having a given total area of disc require to have but seven-tenths the diameter of single screws of the same power, they would appear to require but seven-tenths the pitch, and would thus require to make more revolutions per minute for a given speed than would single screws, the comparative number of revolutions in a given time being as 10 to 7. Now a rapidly revolving screw gives the very opportunity for the most economical form of engine, so far as lightness and adaptability to expansive working go. If a given speed of piston be determined upon in both cases, the engine making the greater number of revolutions would have a correspondingly shorter stroke; but as the engines of twin screw ships are individually smaller than those of single screw vessels of the same power, there seems to be a good opportunity for increasing the speed of piston. The limit of piston speed, especially with improved packings, large bearings, and with plummer-boxes made to admit of a circulation of water through them, appears to have been hardly yet ascertained. One or two boats made by Mr. Bourne had single cylinder engines, which, with a $3\frac{1}{2}$ ft. stroke, made 100 revolutions per minute, equal to 700ft. of piston per minute. But we are not aware that they worked for any considerable length of time at this rate, although it does not appear improbable that marine engines of moderate size might be made to work regularly at 600ft. Practically, for a given power, the necessary weight of engines is inversely as the speed of piston; and the opportunity for this saving appears to be decidedly greater in twin screw engines than in those which necessarily work at a slower rate. Again, high speed engines, by their greater uniformity of motion, and by reason of the very small space of time for cooling the interior of the cylinder at each stroke, are the best for high expansive working. The irregularity of the motive force throughout the stroke in slow working engines, when the steam is expanded, say, four or five-fold, has led Messrs. Maudslay to introduce three-cylinder engines, and these are already largely in use. At a hundred instead of fifty revolutions per minute, however, the irregularity of motive force would be much less apparent, notwithstanding that the inital and final pressures on each stroke might vary as much as in the case of the slow working engine.

"Twin-screw vessels present an interesting query as to the number of cylinders necessary for each engine. For single screw steamers a pair of cylinders is almost invariably employed, and even triple cylinders, as in the *Tasmania*, and in Messrs. Maudslay's engines of the *Octavia* class, are at least as common as engines with single cylinders. In America, it is true, large screw coasting steamers are made with single cylinders as large, in some cases, as 84in. in diameter, for $3\frac{1}{2}$ ft. stroke. Those who know what it is, with the forward engine of a pair broken down, to get the after engine "over the centre" in starting, will not have much faith in single cylinders for screw vessels. But with twin screws, where each engine can be started independently of the other, and where way can be kept on the ship if one engine is stopped, the difficulty of starting a single engine to each screw shaft would not, probably, be great. In all the twin screw vessels made by Messrs. Dudgeon—most of them being blockade-runners, for which the greatest certainty of working is indispensable—there is a pair of engines to each screw shaft. Duplicate pairs of engines are alike provided in the large trading steamer *Far East*, and in a small rifle-proof boat, of 40-horse power, lately made by these makers for the Dutch Government. For commercial steamers, however, it is probable that a single engine to each screw shaft would answer every purpose.

"In horizontal engines working athwart ship, it is evident that the working parts may be more conveniently arranged where there are two shafts, each some feet to the side of the keel, than a single one directly over it. There is no need, in the former case, for the double piston-rod arrangement, nor for the truck engine, nor the short connecting-rod type sometimes employed. There is additional room to get in the working parts, and if a shorter stroke be adopted, every thing in the engine is shortened with it. The shorter stroke affords a better opportunity also for a good arrangement of vertical engine."

Hardening Steel in Oil.

We take the following statements in relation to hardening steel in oil from Mr. Holley's recent work on "Ordnance and Armor" :—

"The substitution of a solid-forged steel barrel for the Armstrong coiled tube has often been attempted by Mr. Anderson, although he did not succeed well with steel until the process of hardening in oil was adopted. The apparatus for this process is very simple. An iron tank, filled with oil, and made deep enough to take in the tube vertically, is set within a tank of water, to keep the oil cool. Within the orbit of the crane for lifting the tube is a heating furnace with a wood fire. The temperature of the oil is raised to 280° by a 110-pounder inner tube."

High steel hardened in oil was found by Mr. Kirkaldy to have a tenacity of 215,400 lbs. The following is the provisional specification of Mr. George W. Rendel—one of the Elswick Ordnance Co.—dated November 13, 1863, which sufficiently describes the very simple process:—

"I bring the cannon or parts of cannon to a suitable heat in an oven, or any convenient furnace, and I then plunge them into a bath of oil or other liquid; or instead of plunging the cannon or parts of cannon, I pour the liquid over them; and to keep down the temperature of the liquid, which is raised in the act of cooling the cannon or parts thereof, I employ pipes winding through the liquid, in which pipes a current of cold water circulates, or the liquid may be cooled by any other suitable arrangement; but any arrangement for cooling is not essential to the process of strengthening, being only a matter of convenience, as having the effect of reducing the volume of liquid necessary for cooling large masses of metal."

THE opening of the Suez Canal to navigation throughout its entire length, from the Red Sea to the Mediterranean, has been officially announced to all the chambers of commerce in Europe by M. Lesseps, president and superintendent.

FLOATS in boilers to determine the hight of water are little used at the present time.

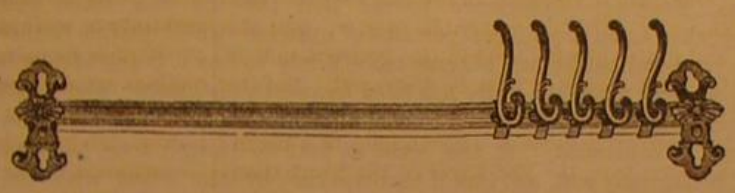
Improved Hat and Clothes Bar.

The portable hat rack which has been recently introduced, has proved very popular, and there seems to be a general demand for an article of this kind. The illustrations published herewith represent a new style, which can be folded up in a small compass, or extended so as to be used for a number of garments. It is light, convenient, and ornamental, and but little more expensive than ordinary brackets and screws, while it has a good feature in being easily taken down when in the way, and of not marring the walls or doors. The bar is made of the best seasoned black walnut; the hooks are finely finished and japanned or bronzed, and, when ordered, made of brass. Fig. 1 shows the bar as hung on the wall. Fig. 2 shows the hooks as made to slide over the bar; also the rack as it may be closed up; any number of hooks desired can be placed on the bar by simply removing the end piece. Fig. 3 represents the folding rack; the hooks slide on the bar as in Fig. 1. They are also made to turn in a socket, and can be laid flat with the surface of the bar, and when not in use the rack can be folded up in a small compass. For travelers, boarders, as well as for use in families, offices, and hotels generally, this will be found a useful article. It was patented on the 1st of November, 1864, through the Scientific American Patent Agency. For further information address Pratt Brothers, sole proprietors, No. 53 Fulton street, corner of Cliff street. New York.

Fig. 1.

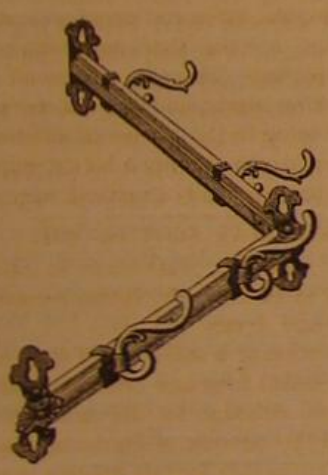


Fig. 2.



PRATT'S HAT AND CLOTHES BAR.

Fig. 3.



THE ICHNEUMON FLY AND THE DUSKY VAPOR MOTH.

At the last meeting of the Farmers' Club a letter was read asking the names of certain insects which were forwarded in a little paper box. The inquirers were referred to Dr. Trimble, who, after a brief, but careful examination of the specimens, remarked—

These in a cluster of what the writer calls eggs, are not eggs at all; they are cocoons of the ichneumon fly. This other specimen is the Dusky Vapor moth. The caterpillar of this moth is exceedingly beautiful. Caterpillars, as everybody knows, are generally very unprepossessing, but the caterpillar of the Dusky Vapor moth is one of the most beautiful insects that we encounter. I have found them on the shade trees of this city, and they trouble apple trees to some extent. But their numbers are kept within narrow limits by their great enemies—the ichneumon flies. This fly deposits its eggs within the body of the caterpillar, where they hatch, and the larvæ eat up the body of the caterpillar. I have watched these flies going from one caterpillar to another to select a suitable one in which to deposit their eggs. The fly is easily distinguished, she has four wings and a long slender body, more like a wasp than a fly. The instinct by which she selects a caterpillar in which to deposit her eggs is wonderful. When she alights upon the back of a worm she seems to know instantly whether the body of that worm has already been supplied with eggs or not; and you will see her touching on the back first of one caterpillar and then of another, till she finally finds one free from eggs. She then thrusts her sharp ovipositor into his body, and pushes in as many eggs as will hatch worms enough to eat up the body of one caterpillar.

The caterpillar of the Dusky Vapor moth has an instinct also not less wonderful. If the caterpillar is to produce a male moth he simply winds his cocoon and attaches it to a leaf. But if it is to produce a female moth it winds a portion of web around the stem of the leaf and around the branch on which it grows, so as to fasten the leaf to the branch. This is done to protect the eggs through the winter. Of course the cocoon of the male moth requires no such provident care, and the leaf to which it is attached is consequently left to fall. This is one of the most wonderful manifestations of mysterious instinct to be found in the world of insect life.

Well-boring Machinery at the School of Mines, Philadelphia.

The authorities of the Polytechnic College of Pennsylvania have shown great liberality in providing their several technical schools with the best means of illustration. The schools of chemistry, civil engineering, architecture and mechanical engineering have all had valuable additions made to their collections and cabinets, and, more recently, the school of mines has received, among other models, from Germany, a full set of the instruments used in boring the deep salt wells of that country. The models are made to scale, and they comprise the Derrick, the Cumberland levers, the cutters, reamers and enlargers used in boring; the sand pumps for drawing up the cuttings of stone; jars, crabs and impression blocks, for recovering fragments of broken tools, and the iron rods, wooden poles and connecting pieces, to which the tools proper are attached. Well-boring has been brought to greater perfection in Germany than anywhere else, and the importation of the best tools from that quarter will not only prove of value to the college students of mine engineering, but also to the great industry, which has so suddenly grown up in the north-western portions of Pennsylvania, Virginia and the southern counties of Ohio. That industry now demands the best and most expeditious machinery for its development, and it cannot be doubted that the opportunity which the Polytechnic College affords of examining the best form of boring tools used abroad, and of comparing them with those employed here, will, in due time, enable American inventors to produce boring machinery superior to any now known on either continent.

Japanese Matches.

Dr. Hofmann lately exhibited to the London Chemical Society some small paper matches, which were lately given to him, and said to have been brought home from Japan. He lighted several of these matches, which burned with a small, scarcely-luminous flame, a red-hot ball of glowing saline matter accumulating as the combustion proceeded. When about one-half of the match had been consumed, the glowing head began to send forth a succession of splendid sparks. The phenomenon gradually assumed the character of a brilliant scintillation very similar to that observed in burning a steel spring in oxygen, only much more delicate, the individual sparks branching out in beautiful dendritic ramifications. His first idea, Dr. Hofmann continued, had been to look for a finely-divided metal in the mixture. But when examined in his laboratory it had been found quite free from metallic constituents, and to contain carbon, sulphur, and nitre only. These constituents were present in the following proportions:—Carbon, 17·32 sulphur, 29·14; nitre, 53·64. Each match contained about 40 milligrammes of the mixture, which was folded up in fine paper. There had been no difficulty in imitating these matches.

ROTHFELDER'S IMPROVED CHRONOMETER ESCAPEMENT.

The inventor of this movement furnishes the following description of its advantages and action:—

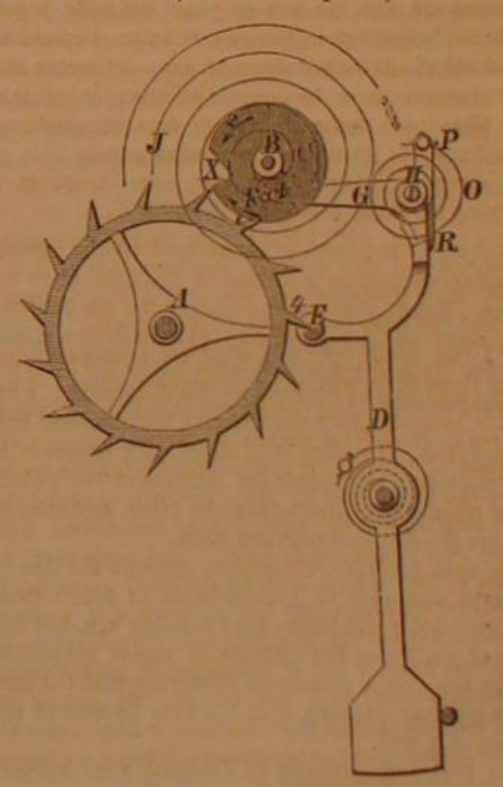
"For half a century the English and French have vainly endeavored to improve and simplify the chronometer, but for all practical and scientific purposes their endeavors have not been crowned with any remarkable result. In this improvement the chronometer, with all its former intricacies, is rendered at once simple, and enables the practical watchmaker to manufacture and repair chronometer escapements with comparative ease, while heretofore it has required considerable skill.

"The cost of the article is by this improvement much reduced, and will enable individuals to supply themselves with one at a limited cost.

"The nature of this invention consists in the construction of the locking lever of chronometer escapements, the same being provided with a secondary or assistant lever, upon the end of which the ruby pin or lifting pallet of the balance operates to disengage the detention on the locking lever from the escape wheel, whereby this escapement operates with more precision and less friction, is more durable, and can be manufactured with greater facility.

"The drawing represents a plain view of the working parts of the escapement in action, when commencing to disengage or unlock the scape wheel.

"In the engraving A represents the scape wheel; B the balance arbor; C the main pallet; D the locking lever; E is the detent pin, which locks the scape wheel; F is the lifting pallet or ruby pin on the main pallet, and G is a T-shaped lever or assistant lever, pivoted to the end, H, of the locking lever, D. Its central arm extends tangentially towards and underneath the main pallet, terminating in a pointed end, I, which engages at proper intervals the lifting pallet, F. J is the ordinary balance spring; K is the balance to the escapement; L is a spiral spring which presses the locking lever against the stop pin, N, and also brings the detent pin, E, in action to lock the escape wheel. The assistant lever, G, is provided with two arms, one of them, P, to attack the spring, O, and the other arm, R, to serve as a stop to retain the normal position of the lever, G. The manner in which these parts act upon one another is as follows; The escape wheel, A, is supposed to be at rest, its tooth, 4, resting upon the detent pin, E, of the locking lever, D, the balance, however, being in motion and the lifting pallet, F, traveling in the direction of



the arrow, 2, now coming in contact with the lever, G, it will move the locking lever, and consequently the detent pin, E, thus liberating the tooth, 4, of the scape wheel, therefore the notch, X. in the main pallet comes in position, and the tooth, 1, falls in to act upon the side of the notch, X, and giving an impulse to the balance. Now, before the tooth, 1, has left the side of the notch, X, the end, I, of the lever, G, has escaped the lifting pin, F, and the locking lever, D, and detent pin, E, fall back and lock the scape wheel again, and on the return of the balance, as shown by an arrow, 1, the lifting pin, F, forces the end of the lever, G, off, to pass by, whereafter the same operation as before described takes place."

A patent was granted to Mr. Rothfelder for the above described improvements on the 28th of January, 1865. The inventor has also made application for a patent on another improvement, which consists in the winding up and setting of the watch without the aid of a watch key—so many times found wanting when most needed; its mechanism is of the simplest kind and very practical and will not only be an improvement in new watches, but can also be applied to every kind of watches already in use at a trifling expense. These improvements can now be inspected at Mr. Rothfelder's place of business, Nos. 33 and 35 John street, Office No. 1, where any further information can be had.

Correspondence

THE WAY THE EARTH IS MEASURED.

Messrs. Editors:—While looking over an article on the French Metric system, published on page 44, vol. X., (new series) Scientific American, the following query suggested itself to my mind, and I dare say many of the readers of your valuable paper would be pleased to see it answered in your columns.

How did the French mathematicians determine the exact distance from the equator to the pole, as this must have been done previously to their deciding that $\frac{1}{10000000}$ of it should constitute their unit of measure? N. S.

Haverhill, Mass., Feb, 11, 1845.

[The size of the earth is ascertained by the simple process of measuring a degree of latitude upon its surface. Every ship master ascertains his latitude every clear day by observing, by means of a quadrant, the hight of the sun at noon, above the horizon, and the latitudes of places may be determined with greater precision by more delicate instruments and observations. To learn the length of a degree it is only necessary to observe the latitude of two points one of which is due south from the other, and then to measure the distance between them.

The first recorded attempt to measure the size of the earth was that of Eratosthenes, of Alexandria, who lived 300 years before the Christian era, but his mode of getting at the latitude of one of his places was by the rough process of observing that the sun, at the summer solstice, sent his rays directly to the bottom of a well.

The first measurement of a degree with modern accuracy was made by Picard, of France, in 1699, and since that time several have been made with great care and labor in different parts of the earth, so that not only the size but the form also of our planet has been determined with great precision. From a complete discussion of all the observations, the astronomer Bessel concludes that the diameter of the earth at the equator is 41,847,194 English feet, and through the poles 41,707,808 feet; showing the diameter to be $\frac{1}{300}$ part greater through the equator than through the poles.

One of the most trustworthy measurements of a degree was that made by Mason and Dixon, in the preliminary surveys for determining the starting point of their famous boundary line between Maryland and Pennsylvania.—Eds.

The Linen Manufacture.

Messrs. Editors:—Until 12 years ago I was a linen manufacturer in Great Britain, having a thorough acquaintance with Dundee, Belfast and Leeds linen manufacturers. I have made all kinds of linen goods and know how extensively and satisfactorily they are used there. These mills here have some 1500 looms which in former times were employed in cotton and now the companies have invested in linen as an addition to their business and not at all as a substitute for cotton. We make about 1500 seamless, 2 bushel grain bags per day, one half has cotton warp and tow filling and the other half, say 750, has flax warp and tow filling. This last bag is really flax warp and tow filling. This last bag is really a first class article and far superior to any I have seen in England for quality of material used. From tests of strength I have made of the yarn I find that the flax warp stood the strain of 20 lbs. weight to three threads stretched 57 inches; the filling stood about the same, while cotton warp broke at 5 lbs.

Any statistics or information which I can give or you may desire shall be gladly given you at any time.

John R. McNally.

Stark Mills, Manchester, N. H., Jan. 31, 1865.

[We should be pleased to receive any statements of facts in relation to the linen manufacture.—Eds.

Boiler Scale.

Messrs. Editors:—Experience proves that the scale deposited upon the internal portions of a marine boiler is rendered harder and adheres more firmly to the iron surfaces when the water has been frequently driven out, and the boiler allowed to cool off. From this it may be concluded that the scale, as first deposited, is naturally soft, and that it becomes hard by calcination when the boiler is allowed to cool down without the presence of water. It is, therefore, advisable, in all practical cases, when it is desired to remove the heated water from a boiler, not to blow it off hot, but first cool it by the admixture of cold water, and then run it out.

The condition of the internal surfaces of a boiler greatly affects the nature of the salt deposit upon them. Surfaces coated with a slight film of rust have less affinity for scale, and this deposit is comparatively soft, and more readily removed. The amount and nature of the scale will, of course, vary greatly with the density at which it is deposited, and more strikingly with the temperature.

Water containing in solution a large percentum of carbonate and sulphate of lime, forms upon evaporation, particularly at high temperatures, a very hard, compact and regular deposit, which is a perfect nonconductor of heat. Bearing this in mind, the density of the water in the boiler should be kept considerably lower than usual when a predominance of these impurities exist. Various substances have been applied to the internal surfaces of a boiler, in view of lessening the deposit of scale, or at least its tenacity to the iron, but with little success. Tallow, well applied, is beneficial, and has a preservative effect upon the metal, but may be objectionable on boilers liable to foam.

When a surface condenser is used in connection with the boiler the density of water can be safely allowed to ascend above the usual mark. Of course with a perfect surface condenser there is no density to be considered, but unfortunately all surface condensers leak more or less. The density at which the water can be kept with safety, will depend upon the amount of blowing necessary to keep it at the usual density of $1\frac{1}{2}$-32. That is to say, when the amount of blowing is small, the density can be carried above $1\frac{1}{2}$-32, and vice versa. This is evident, as the impurities that deposit in the form of scale are by far the lesser of those contained in the water used, and must be necessarily small in the total amount, when the leakage of salt water through the condenser is also small. The saturation of water is mainly caused by the presence of chloride of sodium and magnesium, which do not deposit within the range of $\frac{1}{32}$ to $\frac{1}{2}\frac{1}{2}$ at ordinary temperatures.

It will be found advantageous, as well as economical, to carry a high degree of saturation in such cases, as a slight film of deposit is beneficial in preserving the internal portions of the boiler from rust and corrosive action. B. E. C., U. S. N.

Letter from an Inventor.

Messrs. Editors:—With much gratification I learn by your excellent paper that you have succeeded in obtaining a patent for the "Last Wrench." I feel very much pleased with the interest you have always manifested in all the business entrusted to your care. Promptitude seems to be the motto in everything connected with the Scientific American.

I am doing very well with all my patents.

George Meader.

Ottowa, Ill.

The Problem of Two Wheels.

Messrs. Editors:—Herewith is an attempt at a reply to the problem in the last No. of the Scientific American.

Let A and B be the wheels, part of each of which is composed of wood and part of iron, as required by the problem, A having the iron placed near the center, and B having it disposed around the periphery, the wood occupying the alternate parts of each.

Now the periphery of each wheel will, in rolling, require to travel a distance equal to twice that over which the center moves, since every portion of it performs one revolution round the axis, at the same time that it is being carried forward with the axis, a distance equal to the circumference. Hence the motion of every other part is greater than that of the center, but decreases as it approaches the center and the iron, when placed around the outside of the wheel, travels farther than when it is nearer the axis. As it is specifically heavier than the wood, its inertia is greater, and it will require a greater force, or its equivalent, since the force in each case is equal, or a longer time, to acquire an equal velocity. Therefore, the wheel with the wood on the rim will pass the more swiftly down the inclined plane. On reaching the level it will be somewhat in advance of the other, but as its inertia enabled it more quickly to attain its highest speed, so it loses it the more readily, and the other soon commences gaining on it, but does not overtake it till after it has come to rest. Both will stop at precisely the same distance from the point of starting, since an equal impulse is given to each, viz.:—the weight of either, falling the perpendicular hight of the inclined plane.

Yours respectfully, H. H. S.

Hart's Village, N. Y., January 31, 1865.

[We think our correspondent is right in all respects except the relative positions at which the wheels will stop. Perhaps some of our correspondents will construct a pair of wheels as described and try them. Let them be precisely the same weight, size and form, constructed of wood and iron, but have the iron in one disposed around the periphery and in the other at the center. Then let them roll down an inclined plane and along a level floor, and see what will be their relative motions.—Eds.

Wood-working Machinery Wanted.

Messrs. Editors:—We are at present making some enlargements and alterations of our works, and wish to improve the wood-cutting, etc., department. We know that America is far before any other country in that respect, and are anxious to get to know the chief inventions or machines in use in the States. We begin with the timber in the square log of 20 to 24 inches square, and from 18 to 24 feet long. The timber is St. John pine and birch; also haywood, etc. We make it into square pieces of 4 and 5 inches, and into boards, etc., and then into uses for machinery purposes. We have seen a great many machines of American origin, as for instance those supplied to the British Government, used at Enfield in the make of rifle barrels. We should be glad to receive from you the prospectuses of the various best makers of all kinds of wood-cutting machinery, and engravings or sketches. From these we could then select and write you again. Perhaps you can learn for us the terms on which we could then order any machines. We also wish to get a list of the best American works on engineering, wood-cutting, etc., and of scientific works generally, and to know how we could procure these books. J. Harrison & Sons.

Blackburn, Eng., Jan. 19, 1865.

[We trust that some of our enterprising manufacturers will furnish the information sought for by our correspondents.—Eds.

Snow for Ice-houses.

Messrs. Editors:—There are many who would like the luxury of ice during the summer but who live where they cannot secure it without great expense, if at all. For their benefit I would suggest the use of

compressed snow. It can be compressed into square blocks suitable for conveyance and packing by any simple contrivance, and will keep as well as ice, without more than ordinary precaution.

H. W. Bleyer.

Buffalo, Feb. 9, 1865.

A Steam Carriage of the Olden Time.

Messrs. Editors:—It has occurred to me that a description of a steam carriage which I saw some thirty years ago might be interesting to many of your readers, inasmuch as nothing has ever been publicly mentioned, to my knowledge, concerning it.

This carriage was made by a machinist in Brattleboro, Vt., and successfully worked as an experiment on the roads in that vicinity. It very nearly resembled a common one-horse wagon. The boiler was made of a series of 1¼ or 1½-inch tubes, bent in the form of an ox bow, or U-form, and so arranged that one branch served as the grate bars and the other branch as the roof of the fire place. The ends of the tubes terminated in two cylinders of from four to six inches diameter; the upper one being surmounted by another cylinder of larger capacity for a steam chamber. Two piston cylinders—3-inch pistons—worked harmoniously under the bottom of the carriage. These, by means of a short crank shaft, with a crank at each end and a chain wheel between, communicated motion and power to the hind axle by a chain belt and a longer chain wheel on the hind axle.

F. G. W.

Worcester, Mass., Jan. 25, 1865.

The Names of the French Weights and Measures.

Messrs. Editors:—In your interesting and valuable paper of the 28th ult. I read an article on the "Metric System." As I am an admirer of that excellent system I do not wish to see the terms which designate the French measure altered in such a way that they will sound as unmusical and gutteral as the Red man's tongue. By all means let us have the pure French names. Scholars, engineers, the people—all, will learn the true pronunciation, and, in the end, be more satisfied. I have ventured to call your attention and the attention of persons interested in a new system to the manifest error above named.

Although I am not a subscriber on your books yet I cannot do without your paper, and anxiously look for the succeeding number, wishing the while they came oftener.

Chas. Fred. Thomas, Jr.,
Engineer U. S. Senate.

Washington, D. C., July 29, 1865.

Aquaria Cement.

Messrs. Editors:—Your correspondent wants a good cement for an aquarium. The following I have used five or six years:—

One part, by measure, of litharge; one part plaster of Paris; one part fine beach sand; one-third part fine powdered rosin; mix all together. This may be kept for years, while dry, in a well-corked bottle; when used, make in a putty with boiled linseed oil; a little patent dryer may be used; it will stand water at once, either salt or fresh.

A cheap aquarium is made as follows:—

Cut a narrow groove in a board the size you wish; set four pieces of glass on edge in the grooves; put a piece of zinc in the bottom; on the board make a light frame, the size of the top, with grooves; pass a small rod through the frame down the inside of the corners, through the bottom, and screw up tight; put the cement in all the corners, and you will have an aquarium at very trifling cost.

N. Hallock.

Queens, L. I., Feb. 6, 1865.

Effect of the Earth's Cooling.

Messrs. Editors:—The statement made in the subjoined article has created some little talk among certain circles in this vicinity, and there seems to be quite a diversity of opinion as to the Doctor's conclusions, among the most reasonable is this, that contracting the circumference of the earth would not shorten the time of revolutions on its axis; for two bodies of equal weight but of different dimensions, if removed from external friction, will revolve with equal force and velocity, as is proved by the falling of a feather in a vacuum; and as this mundane sphere is floating in ether which exerts no friction upon it, there would be no difference in its time of revolution if it were contracted to one-half or expanded to double its present size. Another says that the momentum of the earth's revolution would continue the same if its diameter were shortened, and hence its rotary motion must increase in the ratio of its concentration. You may see the practical effect of this law by the winding up of a revolving weight around your hand—like a sling. You may see the speed (of revolution) increase as the string shortens.

Now, as we do not presume to be philosophers enough to determine the actual fact, we beg to ask your decision, as you are conversant with these matters, either by letter or through the columns of your able journal.

W. E. P.

Boston, Mass., Jan. 30, 1865.

"We find in Ayer's American Almanac the remarkable statement that the temperature of the earth has not diminished more than 1-306th part of one degree Fahrenheit for 2,000 years. To our inquiry how he could make such an assertion, Dr. Ayer writes us the following answer:—'Hipparchus gives the exact record of an eclipse in his time. This enables us to measure with extreme accuracy the earth's diurnal revolutions since to any eclipse now. Diminution of its heat would by concentration shorten its axis, and consequently its time of revolution on its axis. The data show that this change has been only such as I state it, mathematically and indisputably true.'"

[The proolem is very simple, and the position of the second gentleman is manifestly correct. If a revolving sphere contract in size, the matter at the surface will tend to preserve its velocity, and this will cause a greater number of revolutions in a given time.—Eds.

Melting Platinum.

Messrs. Editors:—Will you be kind enough to inform me whether any method has been found out to melt platinum. I have understood from one or two gentlemen from New York that it has been done with success, but they were unable to give me the modus operandi. Platinum exists in Peru in more or less quantities, and I am very anxious to know the new method of treating the ore, as it must be vastly cheaper than the old one, with nitric and muriatic acids?

Gerrit S. Backus,
Civil Engineer.

Lima, Peru, S. A.

[Platinum can be melted by the compound blowpipe. If it is to be melted in large quantities it should be first heated white hot, together with a fire brick on which it is to be melted.

Prof. Mapes tells a good story of his journey to see it done. One day he called on Dr. Chilton and asked the Doctor if he had seen the account of a man in Philadelphia melting large quantities of platinum. The Doctor said he had.

"Well," says Prof. Mapes, "take your carpet bag and let us go on and see how it is done."

They arrived in Philadelphia, and calling upon the man, who was a watchmaker, asked him if he would show them how he melted platinum in such large masses. The man answered very politely that he would. Then putting a fire-brick into his muffle, he invited the gentlemen to take seats for a few minutes. When the brick was white hot he took it out, placed his platinum upon it, and directing the blaze of his blow-pipe upon the metal, soon saw it glisten and run.

As the gentlemen came out of the shop Prof. Mapes remarked to Dr. Chilton:

"I say, Doctor, did you ever see two bigger fools than we are, to travel ninety miles to see a man heat a brick?"

Platinum is so very refractory that when melted on a brick that is white hot it will chill and harden before it runs off the brick.—Eds.

The Track of an Army.

The track of an army is generally marked by desolation and suffering, and the evil effects attending the passage of armed men through a hostile country has been made the theme of more than one ambitious essay.

As our armies retake territory unlawfully held by the insurgents striking proofs of the intelligence and animating spirit of the individual soldiers of our armies is manifested. We are frequently in receipt of letters like the one subjoined:—

Messrs. Munn & Co.:—I have the honor to acknowledge the receipt of your communication, by which I learn that a patent has been granted to me on my rotary steam engine. I am indebted to your skill for the promptness with which you have proceeded in my case. I can heartily recommend your Agency and your paber to all my friends, or those who have any interest in the Patent Office or in the promotion of the useful arts. Very respectfully,

John R. Ellis,
Private, Co. F, 22d Wis. Vols., 2nd Brigade, 3d Division, 20 A. C.

Hardenville, S. C., Jan. 23, 1865.

To Color Scarlet.

A correspondent of the *Prairie Farmer* thus speaks of her method of dyeing scarlet. Similar recipes have been frequently published in the Scientific American, but there are, doubtless, new readers who will be glad to learn the process:—

"Take one oz. cochineal, two oz. solution of tin, one half oz. cream of tartar. Take soft water enough to cover the goods, and make it boil, then add the cochineal. In five minutes after put in the solution to tin, and in five minntes more put in the cream tartar; then in five minutes more put in the goods, and boil till the water is clear. This is intended for one pound of yarn. Tin or brass kettle should be used.

"For coloring green, I put 2oz. indigo into 4oz. oil vitriol (sulphuric acid), about two weeks before I want to color; shake well every day. When ready for coloring, I make a strong decoction of black oak bark sufficient to wet what I design to color; to this add one pound of alum to every eight pounds of yarn, stirring until all the alum is dissolved. Then pour in the mixture of indigo till I think I have it of the shade desired. Then put in the yarn as much at once as I can—let it be over the fire 25 or 30 minutes; then lift it out to air a few minutes—return it to the kettle and let it simmer three hours, stirring it frequently. I think two ounces of indigo will color 10 pounds of yarn deep green and five pounds pale green. The pale green is managed in the same way, only use a less quantity of indigo."

Facts concerning Shells.

The Pittsburgh *Commercial* says:—

"The shell department attached to the Fort Pitt foundery contains many curious and interesting things. The core of each shell is baked and varnished in the same manner as the molds for casting the guns. One good molder, with a helper, will cast from thirty to forty per diem of the 8-inch shells, and the establishment is capable of turning out on an emergency five hundred shells per diem. At present, however, they are only making about one hundred per day. Fifty tons of iron per week are used up in this department alone. Each shell, after being cast, is ground on an emery wheel, polished and hammered until it is perfectly round and smooth, qualities determined by gages, which are made with such nicety as to detect an inequality of the four-hundredth part of an inch on the surface. The interior of the shell is also gaged to determine its thickness, which must be of an exact regulation—as, for instance, one-and a-half inches in thickness for an 8-inch shell and two inches for a 10-inch. For these shells, when finished, Government pays but 6½ cents per pound, which is 3½ cents per pound less than is paid for a finished columbiad.

SPECIAL NOTICE.

W. O. Hickok, of Harrisburg, Pa., has petitioned for the extension of a patent granted to him on the 17th day of June, 1851, for an improvement in regulators for the pen beam in ruling machines.

Parties wishing to oppose the above extension must appear and show cause on the 29th day of May next, at 12 o'clock, M., when the petition will be heard.

From all quarters comes the intelligence that the present season's ice crop will be a very large and fine one. The present state of the labor market favors the securing of an unusual quantity.

Improved Coffee Roaster.

A cup of pure unadulterated coffee, made from berries properly roasted, is one of the most indispensable adjuncts of the breakfast table So far from being unhealthy, it is extremely wholesome, when taken in moderate quantities. It is both inspiring and stimulating, and has the additional merit of never being followed by the reaction or lassitude which characterizes alcoholic liquors or the wish-wash beverages of rye, etc., appropriately termed "war coffee." Much of the coffee ordinarily sold ready-roasted, has been improperly prepared, having been burned in the process, so that a bitter taste and bad color are imparted. Where this is not the case, the life or flavor of the coffee, which is contained in the essential oil of the berry, is driven off with the gases arising from the fire, so that while the appearance is uninjured the flavor is almost lost. It is claimed for he apparatus here illustrated that all these deleterious effects are avoided. That the coffee is roasted evenly throughout, that none of it is burned, and that the aroma is fully preserved. None of the gas arising from the furnace reaches the coffee, so that this injurious exposure, which is common to many coffee roasters, never occurs. The appended description will render the operation and construction of the machine intelligible to our readers (see Figs. 1 and 2). The canister, A, Fig. 1, which contains the coffee, is set in an oven or furnace, B, which is arched over; this furnace contains a metallic retort, C, around which the flames and heat from the furnace passes on its way to the chimney through the flues, D (see Fig. 2). In this retort the pipe, E, enters at top and bottom (Fig. 2). This is simply the plan of the apparatus. When the coffee is to be roasted it is put in the canister through the door, F. The outer doors are then closed, and the retort is heated to a dull red color, the canister, A, being put in motion meanwhile by a belt on the pulley, G. The retort is then full of the fumes and moisture driven off by the heat. To discharge these the damper, H, which has previously been closed is now opened, and the retort chamber freed. This fumigating process, so to speak, occupies about five minutes; at the end of this period, the aromatic flavor of the berry begins to evolve, and the damper, H, is closed. "The hot air of the retort," says the inventor, "carries the aroma up through the pipe, E, where it is cooled, so soon as it reaches the air, and falls into the retort, only to again circulate through the coffee, as it rotates, thus a complete circulation of the coffee in its own heated atmosphere is obtained which results in a superior article." The coffee is then removed by taking out the canister, as usual. We have seen samples of coffee roasted in this manner taken at random from the mass, which were evenly browned and free from burnt particles.

A great saving of time is claimed for this roaster, as it is said a charge can be thoroughly done in ten minutes, while the ordinary time is twenty or forty minutes. The canister is also preserved from being rapidly burnt out, since the fire does not reach it. A great saving of fuel is also claimed from the even distribution of the heat and its thorough circulation, while shielding the coffee from the coal-gas is of great importance. This roaster was patented on the 8th of October, 1861, by Henry E. Richards, of Bloomfield, N. J. [See advertisement in another column.]

Fig. 1

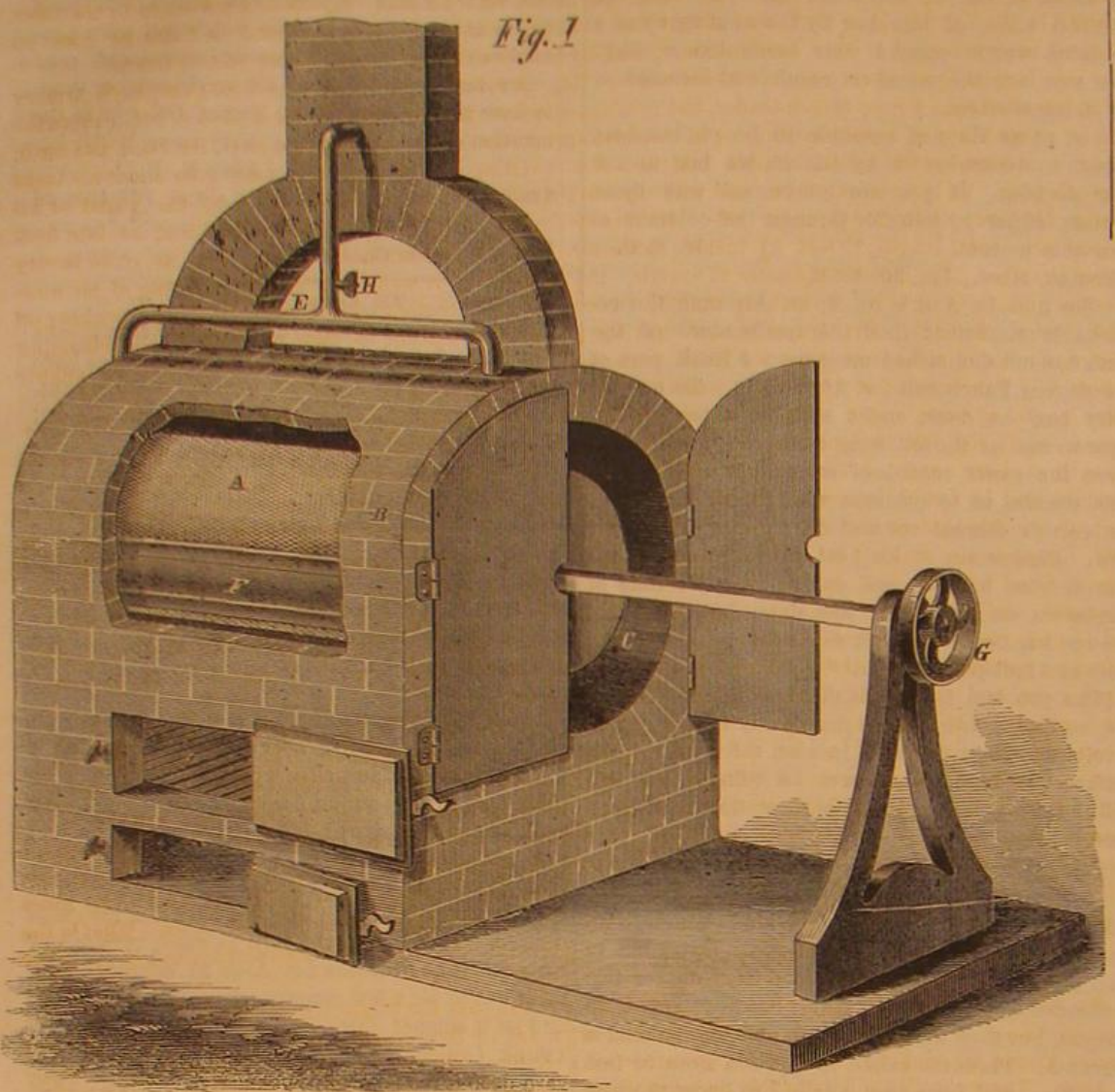
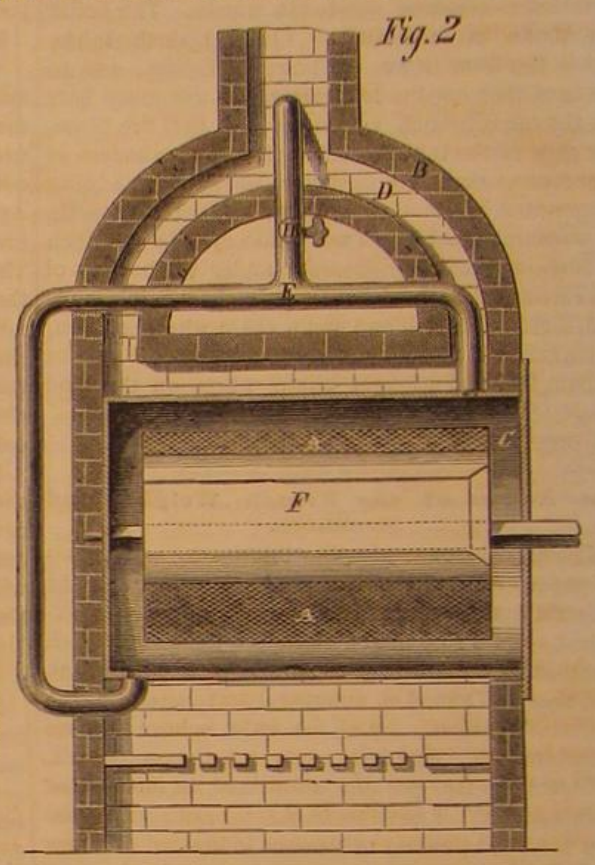


Fig. 2



RICHARDS'S COFFEE ROASTER.

HOLDEN'S SHOEMAKER'S VALISE.

This novel invention consists in combining a seat or work-bench, with a valise, so that the former may be folded up in the shape of the latter and used as a receptacle for garments, as well as a work-bench. The seat is not supported by the framing of the valise but by the *legs*, as shown, so that no part is unduly strained. These legs unscrew, and the whole, when folded, occupies no more space than an ordinary traveling valise. The nails, A, in the head of the one shown folded, come out when the legs are to be inserted, so that there is no external sign of the purposes for which it is intended.

All the tools necessary for a shoemaker can be carried in it, and it is useful for other mechanics as well as those of the class for whom it is shown as adapted in the engraving. For the disciples of St. Crispin, who follow the army, or for those itinerant shoemakers who go from house to house in the country, performing work for persons far from towns,



this will be found a most useful article. Patented through the Scientific American Patent Agency, by S. B. and L. L. Holden, Jan. 31, 1865; for further information address Luther L Holden, *Herald* office, Boston, Mass.

THE WAY TO RAISE BLACKBERRIES.

At the last meeting of the Farmers' Club, Dr. Ward described his plan of cultivating and training blackberries, and as it is a manifest improvement over the common method, we present a condensed report of his remarks.

The vines are planted in rows three feet apart, and three feet apart in the rows. Over each row is stretched a stout wire at the hight of about four feet, with stakes at proper intervals to support it at this hight. As the vines grow they are tied to the wire, and bent down along the wire all in the same direction—that is, all toward the south, all toward the north, or in such direction as may be most convenient.

The berries are borne on the wood of the previous year's growth. In the Spring of each year, the bearing wood of the year before is cut out and removed, and the new shoots are tied to the wire, the lateral shoots of the new wood being at the same time cut back within a foot of the main stalk. Thus the whole labor of trimming and training the vines is performed at one operation. It is better to manure in the Fall, and this all-important matter should be attended to every year.

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VOL. XII. NO. 9....| NEW SERIES. |.... *Twentieth Year.*

NEW YORK, SATURDAY, FEBRUARY 25, 1865.

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THE MATERIAL FOR HEAVY ORDNANCE.

As a general rule, when two ships meet upon the ocean, that one will conquer which has the most powerful artillery. Had the forts below New Orleans been provided with very large guns, they, as well as the city and the control of the Mississippi, would now be in the hands of the rebels. The possession of as powerful ordnance as that in the hands of any other people is a supreme necessity for us if we would maintain our position among the nations of the earth, or even if we would save our liberties from being crushed by superior force.

The necessity for heavy cannon has been fully recognized by our military and naval officers, and owing to their intelligent efforts the United States has been generally in advance of all other nations in this most important element of power, but within a few years the Prussians and Russians, and perhaps the English, have made a stride in advance of us. This has been effected by the use of a better material than that which we employ.

For guns not larger than the 68-pounder, extensive experience has shown cast-iron to be sufficiently strong, and as that is the cheapest material it will of course be employed. The smooth-bore 68-pounder for spherical shot has a bore of 8 inches, and is cast in our service with a weight of 8,465 lbs.

For guns larger than 68-pounders the one property of material which is difficult to obtain is strength. Among all the thousands of substances that are found on our planet or are produced by art, the strongest is cast-steel; and it is by the use of this material that the Prussians have surpassed us in the construction of heavy cannon. Until within a short time it was beyond the power of art to produce masses of steel properly forged of a sufficient size for large guns, but this difficulty is now overcome. From Mr. Holley's recent work on "Ordnance and Armor" we select the following remarks in relation to steel guns:—

"The mild steel made by Mr. Fried Krupp, at Essen, Prussia, is probably more remarkable than any other product of this nature, chiefly on account of the immense size of the solid masses produced. Mr. Krupp's cannon are, indeed, the only solid steel guns that have acquired a special celebrity, although it is probable that some of the Sheffield manufacturers make an equally good material, and will soon produce ingots of equal size. The first of Mr. Krupp's guns was the one in the great exhibition of 1851. Mr. Krupp patented this application of steel to ordnance in England, on Dec. 16, 1861. The great feature of this manufacture is the forging of large masses from single homogeneous ingots, without seams or welds. An ingot of 21 tuns weight, and 44 inches diameter, was shown at the Great Exhibition of 1862. Similar castings are forged every day into shafts, cannon, etc. The head of Krupp's heaviest hammer is said to weigh 40 tuns. The 9-inch gun, shown in the Exhibition of 1862, was at that time the largest cannon forged at this establishment, and by far the largest gun ever forged without welds. It was intended for a Krupp breech-loader, but is adapted to other plans of breech-loading or to conversion into a muzzle-loader by the simple insertion of a breech plug. It is a smooth-bore, and was intended for a 200-pounder to 250-pounder rifle. Its dimensions are—total length, 13 feet 8½ inches; diameter over chamber, 27⅜ inches; diameter at muzzle, 15½ inches; diameter of bore, 9 inches; weight, 18,000 lbs.; price, $10,125. Mr. Krupp is now making a large number of solid-steel guns for Russia; among them fifty 9-inch guns, of 18,480 lbs. weight and 15 feet length of bore, and a larger number of 8-inch guns, of 16,800 lbs. weight and 13 feet 2 inches length of bore, and of 6-inch guns of 8,900 lbs. weight and 10 feet 8 inches length of bore. They are all muzzle-loaders and rifled on the shunt plan. Mr. Krupp is also making for Russia several 11-inch guns, fitted with his own plan of breech-loading apparatus; and it is stated, though not officially, several 15-inch guns, at a cost of 87 cents per pound. Mr. Krupp expresses his readiness to fabricate 13 or 15-inch guns, and states that there are now no mechanical difficulties in the way. The breech of muzzle-loader of any size would be left solid, as the gun would be forged in the shape of a cylinder, and bored out. It may be remarked that the weight of forged masses of a given quality has been increased nearly ten times within a decade. Mr. Krupp sent a 5000-lb. block to the Exhibition of 1851, and one of above 44,000 lbs. to the Exhibition of 1862."

YOUNG'S PARAFFINE OIL PATENT.

We have before us a copy of the decision of the Commissioner of Patents extending the patent of James Young for making paraffine oil, granted Oct. 7, 1850. There are two points in this decision which we do not think have before been settled, in the Patent Office, in extension cases.

The 15th section of the act of 1836 provides that in any suit for the infringement of a patent, the defendant may plead as a defense to the action that the patentee, being an alien, had neglected, for a space of eighteen months from the date of his patent, to put and continue on sale the invention or discovery.

The Commissioner decided that this question was one which ought to be determined by a jury, and that it would be an assumption of power on his part to declare a patent void on that account.

The second point urged against the extension was that Mr. Young had received adequate remuneration from his British patents.

The Commissioner decided that he had no right to take the profits from the foreign patents into the account. The law of our country makes no distinction between the rights of citizens and aliens; and in considering the question of profits arising from the sale of the invention here, the foreign interests could not be offered as a ground for refusing the extension. Mr. Young received a clear profit from his invention here of above $27,000. In Great Britain, it is understood that he has realized between two and three millions of dollars.

SMALL MOTIONS.

No where do we find more palpable evidence of the value of well directed labor than in the mechanic arts. By severe mental exercise we can readily see that one step too much per minute gives so many unnecessary motions per hour, or per day, and that just so much time and strength has been misapplied.

Men perform great tasks sometimes without thinking of them, solely because they have become habituated to them. A practical application of the principle in question is to consider the loss of time and profit which arises from doing unnecessary labor in manufacturing goods of whatsoever nature.

A shrewd maker of saw mills in New Brunswick provides a traveling platform in his mills so that the workman is carried from the pile of timber to the saw back and forth, by mechanical means, he having only to stand still and take the timber and do his work at the proper time. This is not merely exemption from personal exertion, but a direct application of system, or *plan*, to the accomplishment of the end desired. So many movements are made by the table per hour, and if the workman is there he goes no faster or slower, but is doing just so much.

A roller in the Providence Tool Company's Armory makes gun barrels day in and day out. From the furnace to the rolls is but a step; but back and forth, twisting and turning, this man goes about his tasks and earns his bread literally by the sweat of his brow. The number of pounds of iron he lifts from the commencement of the day until its close is very great, and it would not only be a saving of his muscle, but greatly expedite the work if this breaking off from one motion to take up another, and changing the positions of the body a dozen times a minute were obviated.

We are no advocates of sedentary labor, of enforced tasks, of cramped positions. This does not follow what we urge by any means, for what we do deem necessary to the furtherance and full development of manufacturing interests is an organized plan or scheme by which, wherever it is practicable, postive results will be attained when the machines are kept running. This tends to the direct and positive improvement of every thing and interest concerned, employer and employee. As witness a case in point:—

In Germany scissors are made very cheap. One man cuts the steel, another forges a certain part, still another grinds the blades, another polishes, another fits up, and so on, until the work is done. From one machine to another there is a constant succession of stoppages, interruptions, transportations and changes. Work is often carried for miles from one branch of work to the other. What is the result? This; the workman earns about 40 cents per day.

But, says the economist, it only costs him 20 cents a day to live, so he earns just as much as our mechanics. Not so, for by an organized scheme, by the substitution of method for the absence of it, order for chaos, and a direct procedure by the shortest mechanical routes to the desired end, the prices obtained for labor by the German workman would be enhanced ten fold while the cost of his living would be precisely the same. It is very certain that in many of our workshops these hints might be heeded with advantage. They are the small leaks that sink the ship, and the petty losses which eat up profits.

MUSEUM OF NATURAL HISTORY.

One of the most respectable and honorable scientific associations in the country is the Lyceum of Natural History, of this city. It was established in 1818; it embraces the most learned botanists, zoologists, mineralogists, and geologists of the community, and it has a rare scientific library, and a very large collection of objects in natural history. But the books and specimens are packed away in boxes for want of a suitable room in which to exhibit them.

By the reception of a circular, we see that an effort is to be made to raise a fund of from $50,000 to $75,000, to enable the society to hire a building for the display of the collection in a manner attractive and useful to the public.

We trust that this effort will be successful, and that it will be the commencement of a cordial co-operation of the wealth with the learning of our community, a union which will redeem New York from the reproach of having no interest but the accumulation of wealth, and will ultimately raise the city to the very highest position in science and every department of knowledge.

THE longest line of railway in the world is the Grand Trunk Railway, which extends from Portland to Quebec and the river Du Loup, east, to Sarnia, at the foot of Lake Huron, west, with several branch lines, including a total of 1396 miles under one management. It is to be further extended to Chicago, in a direct line from Sarnia, by way of Lansing, the capital of Michigan, a distance of 320 miles—making a total of 1716 miles in all.

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:—

Apparatus for Producing Gas for Heating and Illuminating Purposes.—This invention is an improvement in the mode of and apparatus for producing gas for illuminating and heating purposes, parts of which improvements are also applicable for increasing the illuminating and heating power of ordinary lighting gas; it relates to an improved mode of combining or impregnating ordinary atmospheric air with such a quantity of volatile hydrocarbon as will render it a combustible and illuminating gas, which may be burned in any suitable burner for heating purposes, or in ordinary gas burners in place of the ordinary carburetted hydrogen for lighting purposes. It is also applicable for carbureting ordinary illuminating gas, and by that means increasing its lighting power, which is accomplished without causing the gas or air to pass through the liquid hydrocarbon and without the use of a wick, but by causing a current of air or gas, under a suitable pressure, to pass through a vessel containing a porous mass, or material which is kept saturated with any suitable hydrocarbon. W. H. Buckland, of London, England, is the inventor.

Bolt Machine.—This invention relates to a machine which is used for making that kind of bolts, spikes and rivets where one end of the iron or other material used is upset to form the heads. The various improvements consist in the use of vertical slides carrying at their lower ends changeable dies which are provided at their lower surfaces with cavities corresponding with the size and form of the heads required. The heading tools are changeable and adjustable in a movable carriage or carriages and they are provided with holes or sockets corresponding with the body or shank of the bolt. The carriages are moved horizontally in order that the operative may conveniently place the block or remove the bolt, spike or rivet when completed. The articles after having been operated upon by the header, are partly removed from the heading tools by suitable levers, and india-rubber or other suitable springs are introduced in order to furnish a yielding bearing necessary for the safe working of the machine. The different parts are so arranged that two or more machines may be combined in one frame and that whilst one side of the machine is used for making nuts, the other side may be used for making bolts, spikes or rivets, or the machine may be used for making different kinds of bolts of different dimensions at the same time. For the sake of cheapness the heading tools and dies are made of cast iron with chilled surfaces. J. Watkins, of the London Works, Birmingham, Eng., is the inventor.

Dresser Reed.—Dresser reeds, or reeds used for weaving purposes, are generally made just long enough to fill a beam of a certain length, but it frequently happens—in fact it is invariably the case—that there is so much variation in the length of the center beams that it is very difficult to fill or guide the yarn on them evenly, some of the beams being too short and some too long. This difficulty is obviated by the present invention, which consists in a reed for dressing or weaving purposes, which is made elastic, or arranged in such a manner that it can be expanded and contracted, and that it can be adapted to beams of different lengths. Ambrose J. Nichols, Providence, R. I., is the inventor.

Cigar Machine.—This invention consists in an adjustable mold, in combination with a longitudinally-sliding revolving fork, in such a manner that the filler can be readily placed on the mold and pressed, and by the action of the revolving fork the wrapper can be applied while the filler is in the mold, and the cigar can be finished entirely by the machine in little time. J. Thompson, No. 147 East Twenty-fifth street, New York City, is the inventor.

Loom for Double-faced Tissue.—This invention relates to the manufacture of a double-faced fabric or tissue, consisting of a combination of plain or figured and of velvet parts, the velvet presenting the peculiarity of having a plushing or pile on both faces or sides of the tissue, this pile or plushing being either cut or uncut, viz.: forming either an ordinary plushing or a plush or shag. Pierre Joyot, Jr., of Paris, France, is the inventor.

Patent Claims

ISSUED FROM THE UNITED STATES PATENT-OFFICE

FOR THE WEEK ENDING FEBRUARY 14, 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.

46,317.—Process for Disinfecting Noxious Vapors.—William Adamson, Philadelphia, Pa.:

I claim the use for disinfecting or deodorizing the fumes arising from burning, boiling or fermenting animal matter, of the products of combustion of spent tanbark, old leather, or other material containing tannin, as set forth.

46,318.—Method of Treating Offal.—Wm. Adamson, Philadelphia, Pa.:

I claim utilizing offal by draining, drying and disinfecting it, substantially in the manner described.

46,319.—Butter Mold.—Oliver Allen, San Francisco, Cal.:

I claim a butter mold, constructed and operating substantially in the manner herein shown and described.

[This invention consists in forming a mold by which butter may be divided into parcels of such a shape and quantity as are required in preparing it for market, the mold being varied in size and shape to suit the demand of the fancy which prevails in different communities or markets.]

46,320.—Hot-air Engine.—Cyrus W. Baldwin, Charlestown, Mass.:

I claim, first, Guiding a flexible disk valve, substantially as described.

Second, Also the employment of a secondary furnace, in combination with the primary furnace, and the cylinder of a hot air engine, when located so that the products of combustion from the primary furnace go through the secondary furnace on their passage into the cylinder, substantially as and for the purpose set forth.

Third, And the arrangement in the furnace, in connection with a suitable opening or openings through the wall thereof, into the air conduit pipe, of a perforated movable air-passage ring, so as to be interchangeable with the movable lining rings.

46,321.—Plow.—E. Ball, North Manchester, Ind.:

I claim a cast-iron plow beam, of curved form, longitudinally and transversely, and the lower and rear part having a straight portion or surface for the attachment of the share and mold board, substantially as shown and described.

I further claim attaching the land side, D, to the beam, by means of the dovetail, e, at its front end, and a bolt passing through the land side, and a flange, f, at the rear of the beam, as set forth.

[This invention relates to an improvement in that class of plows in which a cast-iron beam is employed, and it consists in casting said beam of concave form at its land side, whereby strength with lightness is obtained, and the point or share attached to the beam with greater facility than hitherto.]

46,322.—Snow Plow.—Willard N. Ball, LaPorte, Ind.:

I claim, first, The scrapers, C C, in combination with the rotary shovels, F, arranged and applied to a car or truck, to operate in the manner substantially as and for the purpose set forth.

Second, The rotary shovels, V, arranged in relation with the shovels, F, and to operate in connection therewith, substantially as and for the purpose specified.

Third, The arrangement of the shovel, V, substantially as herein shown and described, so that the same may be capable of being folded and expanded, as set forth.

Fourth, The slide, U, and links, Y, arranged as shown, for folding and expanding the shovels, V.

Fifth, The reversing gear, M M, when applied to and used in connection with the gear of the rotary shovels, F V, for the purpose set forth.

Sixth, The combination of the rotary shovels, F V, and scrapers, C, when arranged to operate substantially as and for the purpose specified.

[This invention relates to a new and improved plow for cleaning railroad tracks of snow, and it consists in the employment or use of rotary shovels, in connection with scrapers.]

46,323.—Machine for Drying Tobacco.—John H. Balsley, Dayton, Ohio:

I claim, first, A machine constructed as herein described, for subjecting fine and common cut tobacco to an agitating and separating action, and at the same time to a current or currents of air, said air being heated, rarefied in the common way, all substantially as described and set forth.

Second, The rotating cylinder, B J, in combination with a fan box, F, and endless apron, E, arranged and operating substantially as described, for the purpose set forth.

46,324.—Buckle.—Isaac Bannister, Newark, N. J.:

I claim the combination of two buckles acting upon one center bar, in contrary directions, from the center, the upper tongue resting upon the top of the frame, and the other tongue resting under the under frame, as set forth, and for the purpose named above.

46,325.—Mode of Adjusting Circular Saws on their Arbors.—John Barnard, Alton, Ill.:

I claim, first, So applying a saw to an arbor, having a screw thread cut on it, that the saw, together with its clamping collars, can be adjusted and set at any desired point on the arbor, substantially as described.

Second, The combination of laterally-adjustable clamping collars, C C', with jamb nuts, B B', when the latter are fitted to work on an arbor, having a screw thread cut on it, substantially as herein described.

46,326.—Buckle.—John Bavier, Newark, N. J.:

I claim a buckle with a tongue or tongues that operate by turning outward, at the ends of the buckle, constructed substantially as shown.

46,327.—Washing Machine.—Edward Burke, Philadelphia, Pa.:

I claim the combination of the following parts, the washer, g, in connection with the handle, C C', clamp, b b, bar, f, axles, K and K, by metallic fixtures in slots in uprights, C and C, in combination with platform, A a', india-rubber bands, h and h, and washboard, A, placed on an inclined plane, for the purpose specified.

46,328.—Steam-heating and Fire-extinguishing Apparatus.—Charles S. Brown, New York City:

I claim the combination of the steam engine, boiler, pump and steam heating pipes, arranged substantially as described, so as to be utilized to convey water to extinguish fires, in the manner set forth.

I also claim connecting to the steam heating pipes a pipe to supply water from a hydraulic engine or pump, or other source, and force it through said steam pipe, to extinguish the fire in or around the building heated, substantially as shown and described.

I also claim, in combination with the steam heating pipe or apparatus, and water supply pipe, a stop cock, or valve in the steam pipe, between the boiler and the junction of the water pipe with the steam pipe, to stop the water from running toward or into the boiler, which supplies the steam to the heating pipe, substantially as shown and described.

46,329.—Sight for Ordnance.—James Brady, U. S. Vols., Philadelphia, Pa.:

I claim, first, The combination of the movable sight, G, with the standard bars, E E, for the purpose set forth.

Second, The combination of the sight, H, with the extension bar, F, for the purpose set forth.

46,330.—Machine for Making Buttons.—Henry Bock, New York City:

I claim the arrangement and combination of a presser bar or plate, H, above the die block, provided with a slot, n, to receive the eye of the button, and operating in the manner and for the purpose substantially as described and set forth.

46,331.—Device for Cutting and Shaving Ice.—S. E. Blake, Worcester, Mass.:

I claim the rotary cutter disk, F, in combination with the follower, K, operated by the elastic spring, L, by which the ice is held up to the cutter, the whole inclosed in a box or case, substantially as described and represented

46,332.—Paper Collar.—Wm. S. Bell, Jr., Boston, Mass.:

First, I claim doubling the thickness of this band and cementing the folds together, substantially in the manner set forth.

Second, Folding the collar upon the line, b, by making the edge, a, the guide in such operation.

44,333.—Mode of Raising Sunken Vessels.—Thomas Bell, Bellport, N. Y.:

First, I claim the camels or floats, constructed with transverse beams, d, and adapted to receive the stem or stern of a vessel, in the manner herein described.

Second, The pipes, i i, in combination with floats, A A, of the construction specified for the lifting chains to work through, substantially as and for the purpose herein specified.

Third, The braces, k k, applied in combination with the floats, A A, substantially as and for the purpose herein set forth.

Fourth, The attachment of the chains to the vessel to be raised by means of plates, n n, secured to the vessel by screws, substantially as herein described.

[This invention consists in a novel form and construction of the floats employed for raising vessels, whereby they are better enabled to be kept in place; also, in a novel system of iron pipes passing through the floats, for the reception of the lifting chains, whereby the slipping of the said chains is prevented, which occurs when they pass over the edges of the floats; also in a novel system of rigid braces for keeping the vessel upright in the floats when partly raised, or when a portion of it is above the surface of the water; and further, in a novel system of plates for attaching the chains to the vessel.]

46,334.—Caster for Furniture.—Rowland J. Beardsley, Brooklyn, N. Y.:

I claim a wheel caster, having a screw thread on the outer surface of the socket which receives the revolving spindle, when this spindle is passed through the socket and attached thereto by means of a head formed on its upper end, as herein described.

46,335.—Mode of Operating the Swell of Melodeons.—Daniel Clark and Thomas Stevenson, Buffalo, N. Y.:

We claim operating the swell of melodeons and other similar musical instruments by means of the bellows pedals, substantially as described.

46,336.—Car Coupling.—Charles Clinton, Blooming Grove, N. Y.:

I claim the two jaws, D D, arranged within the draw head, A, substantially as shown, and operated by the gravitating levers, E F, pivoted respectively to the upper journal, e, and at f, and by a link to the other journal, e, the said levers being shackled together by the link, G, the whole arranged substantially as described and represented

I further claim the socket and spring, B, in combination with the shackle or pin, H, and jaws, D D, all arranged substantially as and for the purpose specified.

46,337.—Machine for Making Nuts.—P. Coleman, Philadelphia, Pa.:

I claim the combination of the wheel, A, projecting cam, B, lever, C a, slide, F, and spring, G, when constructed, arranged and operating as herein specified.

[This invention consists in the employment or use of a slide arranged and applied to the machine in such a manner that the slide will be thrust forward in the path of the nut so as to serve as a stop or bearing for the same, and cause it to be held or placed in a proper relative position with the punch, while the latter descends and punches the hole, the slide then receding to allow the punched nut to be moved or shoved out of the way, and then again moved forward to serve as a stop for a succeeding nut.]

46,338.—Railroad Switch.—Marcellus V. Cummings, Winthrop, Maine:

I claim the two frog bars I I', bent or L shaped levers, E G, connected with the frog bars and the switch rails, substantially as and for the purpose herein set forth.

I further claim the suspended arms, K K', arranged respectively with the bar, F, and lever, J, substantially as and for the purpose specified.

[This invention relates to a new and improved railroad switch of that class which is commonly termed self-acting—that is to say, is set by the train itself so as to form a connection with the rails of the track on which the train is to pass.]

46,339.—Tool for Scaling Tubes to Boilers.—John Daley and Joseph H. Marville, Philadelphia, Pa.:

First, We claim the combination and arrangement of the cutters, a b, in the cutter stock, A, the cutter stock being operated by the central screw shaft, C, substantially as herein set forth.

Second, The combination and arrangement of the circular cutter, B, with the cutter stock, A, substantially as and for the purpose set forth.

Third, The combination of the guide, D, with the screw shaft, C, arranged in relation to the tubes, substantially as and for the purpose set forth.

Fourth, The combination of the guide, F, with the screw shaft, C, substantially in the manner described and for the purpose specified.

46,340.—Machine for Making Paper Collars—M. P. Dorsch, New York City:

I claim the reciprocating feeding frame with the sides thereof grooved to receive the sheet of paper, in combination with the griping fingers, substantially as described, and having a mode of operation such as described and for the purpose specified.

And I also claim the reciprocating feeding frame with its griping fingers, operating substantially as herein described, in combination with the dies for embossing and cutting the collars, substantially as described.

46,341.—Construction of Railway Cars.—Davis H. Dotterer, Philadelphia, Pa.:

First, I claim a car body which is composed of successive horizontal layers or strips of wood, secured one upon the other by means of cement and metal clamping rods, c c, substantially as described.

Second, The use of tubes, a a, in combination with the clamping rods, c c, and a car body, constructed substantially as described.

Third, Constructing a car body of two or more sections, put together in such manner that they can be separated at pleasure, substantially as described.

Fourth, The method of applying the links, e e, to the ends of the sections of a car body substantially as described.

46,342.—Operating Ordnance.—James B. Eads, Saint Louis, Mo.:

I claim, first, Supporting a gun of two different points in it

length by a combination of devices on a gun carriage acting in connection with each other in such a manner as to rigidly compel the gun whenever it is moved in a vertical plane to rotate about a point in advance of said devices and at or near its muzzle.

Second, Controlling the horizontal movements of the chassis or lower carriage which supports the gun carriage by a combination of devices acting in connection with each other upon the chassis at two different points in the length of the latter in such a manner as to rigidly compel its longitudinal axis to rotate about a point in advance of the chassis and the devices which control its movements, so that the center of rotation may be on the exterior of a defense wall, while the devices are on the inner side of it at some considerable distance from the center of rotation.

Third, The use of the axis 6, figure 1, at a point not the center of rotation of the chassis when used in combination with other devices for the purpose of producing a center of rotation for the chassis at a different point from said axis.

First, The use of axis 6, figure 1, at a point not the center of rotation of the chassis when used as a channel for the conveyance of power to operate the gun.

46,343.—Watch.—Charles W. Fogg, Waltham, Mass.:

I claim attaching one of the pinions of the train to its arbor by means of a screw thread, substantially as set forth, for the purpose specified.

46,344.—Seeding Machine.—Clinton Foster, Prairie City, Ill.:

I claim, first, The main wheels, B B, which revolve upon the hollow fixed axles, with the flanges, b, that open the furrows to receive the seed through the open spaces, c, between the flanges, b b.

Second, The hollow axles, E E, in combination with the sliding rod, M, screw shafts, F, and circular disks, I, all arranged to operate substantially as and for the purpose specified.

Third, The circular disks, I, in combination with the wheels, B, the latter being provided with spaces, C, and the former provided with notches, e, all arranged substantially as and for the purpose set forth

[This invention consists in placing the seed boxes and seed distributing devices within the wheels of the machine, and pressing the seed into the earth by means of circular rotating disks, which are also placed within the wheels and operated from the latter, all being arranged in such a manner as to form a very simple and efficient device for planting seed either in hills or drills.]

46,345.—Artificial Teeth.—Nathaniel C. Fowler, Yarmouth Port, Mass.:

I claim the combination as well as the arrangement of the metallic guard-plate, C, the vulcanite, D, and the metallic inner plate, B, applied to artificial teeth substantially as specified.

I also claim the combination of the series of tapering holes, b or c, with the aluminum plate in which they are formed, the vulcanite and the artificial teeth, substantially as specified.

I also claim as of my invention and as an improved manufacture, a set of any suitable number of artificial teeth and one or more aluminum plates combined by means of a composition, as hereinbefore described, or its equivalent.

46,346.—Artificial Teeth.—Nathaniel C. Fowler, Yarmouth Port, Mass.:

I claim the improved manufacture of aluminum suction plate for dental purposes—that is, with holes and hooks or staples combined with it, and made by means substantially as specified.

46,347.—Combination of Alloys of Aluminum with Vulcanite.—Nathaniel C. Fowler, Yarmouth Port, Mass.:

I claim, first, The combination of an alloy of aluminum with vulcanite, when the said alloy is used as means of attachment to or in contact with vulcanite, or as a means of attachment to other material exposed to the vulcanizing process.

Second, I claim the combination with vulcanite of metals coated or plated with aluminum or its alloys, in which the said coating or covering is in contact with the vulcanite or exposed to the process of vulcanization.

46,348.—Parallel Ruler.—G. C. Gillette, Richfield, British Columbia:

I claim, first, The levers, d d d' d', joined together by the cogged bars, e e, in combination with the bars, A A', of a parallel ruler, constructed and operating substantially in the manner and for the purpose herein shown and described.

Second, The graduated limb, c, applied in combination with the two parts of the parallel ruler, substantially as set forth, for the purpose of laying off vertically the same distance, which can be measured horizontally on the bar.

[An engraving and full description of this invention will be published in a few weeks in the SCIENTIFIC AMERICAN.]

46,349.—Cultivator.—Samuel Gulick, Kline's Grove, Pa.:

I claim the frame, D, fitted on the axle, A, and connected by chains or cords, E E, to fast pulleys, F F, on a shaft, G, which has its bearings on uprights, C C, attached to the axle, and which serve as guides for frame, D', all being arranged as shown, with a lever and notched bar, or their equivalents, whereby said frame may be raised and lowered bodily and secured at any desired hight, for the purpose specified.

I further claim the pivoted bars, Q Q, when applied to and used in combination with the adjustable frame, D, substantially as and for the purpose set forth.

[This invention relates to a new and improved Cultivator of that class which is furnished with adjustable plows, and it consists in a novel arrangement of parts whereby it is believed that advantages are obtained over others now in use, as regards facility in operating or adjusting the plows.]

46,350.—Bread and Meat Slicer.—John D. Hall, Philadelphia, Pa.:

I claim the combination of the rotary cutter, C, with the cam, K, and feed gage, H, for the purposes specified; and in combination with the above, corrugating the interior surface of the trough, D, for the purpose set forth.

46,351.—Windlass for operating the Center-Boards for Vessels.—Josiah C. Hamilton and Henry W. Hamilton, Washington, D. C.:

We claim the application and arrangement of a conical screw drum on the deck or other place of a vessel in combination with the center-board whereby the slack to the rope or chain produced by the buoyancy of the water pressing the board upward is taken up by the increased surface of the drum in its revolution, substantially in the manner described.

46,352.—Turning Lathe.—Nathan Harper, Newark, N. J.:

I claim, first, The use of slides carrying cutters having free play in a plane at right angles to the axis of the stuff or thing being cut, in combination with springs and shaping bars.

Second, The use of a compound sliding rest, consisting of a slide carrying a cutter that moves in a straight line parallel with the center of the thing being cut, in combination with a slide or slides carrying a cutter adapted to move in a plane at right angles to the axis of the thing being cut or shaped.

46,353.—Machine for Making Book Covers.—James W. Harrison, Washington, D. C.:

I claim, first, The gage, the same being so constructed as to form a box or receptacle to contain a quantity of back linings, and so operated as to place them automatically one at a time in the "case," at the same time the gage is in its position for placing the pasteboards as described, for the purpose herein set forth.

Second, I claim, in combination with the adjustable back gage, the adjustable automatic folding wings, the same being operated by cams, or foot pedals, levers and springs, for the purpose of turning over and securing the cloth on the "cases" in making book covers, as herein specified.

46,354.—Mode of Ornamenting.—Henry Harrop, Greenwich, N. Y.:

I claim the mode or process, substantially as herein described and set forth, for ornamenting or decorating articles of manufacture.

46,355.—Cultivator.—Samuel Henry, Chenoa, Ill.:

I claim the arrangement of the levers, J J, connected by straps, h, to the pivoted frame, F G, and by pendants, K K, to the plow beams, L L, which are hinged to the axle, the said frame, F G, being further capable of lateral deflection by pressure of the feet of the driver, substantially as and for the purposes described.

[This invention relates to a new and improved cultivator of that class which are provided with adjustable plows which work laterally for the purpose of admitting of the plows being moved in the direction specified in order to conform to the sinuosities of the rows.]

46,356.—Box Traps for Animals.—Benjamin B. and John R. Hill, Worcester, Mass.:

I claim the locking catches, D D D D, when constructed and operating in the manner and for the purposes above set forth.

46,357.—Carpet Stretcher.—N. Hill, Caton, N. Y.:

I claim the combination of the duplicate extension bars, B B', provided with bands, C C C C, and locking pins, D D, with the spur blocks, A A', whereby I secure the required range and efficiency as well as compactness for transportation, substantially as described.

46,358.—Pencil-point Protector and Mark Eraser.—Jas. B. Hodgskin, New-York City:

I claim the pencil-point protector and pencil mark eraser made by combining the sleeve or band, B, provided with inwardly projecting groove or equivalent internal projection or projections with the rubber eraser, C, substantially as herein described, as a new article of manufacture.

46,359.—Barrel for holding Petroleum and other Oils.—James Holland, Conshohocken, Pa.:

I claim a barrel composed of the outer casing, A, and the inner casing, B, in combination with an intervening body of cement or equivalent material, substantially as specified.

46,360.—Pump.—Nicholas Hotz, Brooklyn, N. Y.:

I claim the sliding rods, C C2, guides, D, links, N' N2, and arms, c' c2, in combination with the hand lever, M, and the two movable valve boxes, B' B2, all arranged and operating together, as herein set forth.

46,361.—Attachment for Washboard.—Charles H. Hudson, New York City:

I claim, first, The changeable or folding washboard mechanism herein described, the standards, B B, being hinged to the sides of the washboard by means of pins, b, standing in the slots, a', adapted to fit over, c, to hold the parts rigidly, or release them for folding, when desired, substantially as and for the purpose herein set forth.

Second, The bracketed plates, G I G I, hinged on the arms, E E, rigidly connected together by the brace, J, and carrying two or more rollers, H H, substantially as and for the purpose herein set forth.

[This invention relates to an improvement in a rubbing attachment for washboards, which was patented by this inventor February 16, 1864. The object of the present invention is to render the device more convenient for transportation than hitherto, and also more durable, and capable of being attached to any of the ordinary washboards now in use.]

46,362.—Plow.—D. F. Humphrey, Saline, Mich.:

I claim the movable or adjustable landside, C, provided at or near its forward end with a hook which engages with a hole in the landside, A, and fixed adjustably in a verticle slot in the latter, by means of the notches, g, the notched washer, e, and the screw bolt and nut, c f, as described and represented.

[This invention consists in providing a plow with a movable or an adjustable landside, arranged in such a manner that the point of the share may have more or less pitch or rake given it, as may be required.]

46,363.—Burner for Lamps and Lanterns.—John H. Irwin, Chicago, Ill.:

First, I claim the employment of two or more wicks, arranged and operating as shown and described, in combination with a single slotted cone, substantially as and for the purposes herein specified and shown.

Second, I claim providing the wick tube with the partitions, a', as and for the purposes specified.

Third, I claim the combination of two or more wick regulators, E' and F, as shown and described.

46,364.—Seed Planter.—John F. Keller, Greencastle, Pa.:

First, I claim the above-described inelastic roller, in combination with the elastic roller, as a pair of feed rollers for wheat drills or other seed planters, substantially as set forth.

Second, I claim the peculiar adjustable gage piece, H, the same being provided with a point fitting down between the tops of feed rollers, substantially in the manner and for the purposes set forth.

Third, I claim the solid or cast-iron slide, with tips or points fitting down between the tops of the rollers, substantially in the manner specified.

46,365.—Arm Supporter for Riflemen.—Seth Kinman, Humboldt, Cal.:

First, I claim an arm supporter and rest, constructed and operating substantially as herein set forth and described.

Second, The combination of the base or band, A, and bars, E and F, constructed as described.

Third, I claim the bar, F, provided with an arm piece, D, and jointed to a support, E, in such a manner that said bar may be fixed as a rigid support for the arm, or made to vibrate freely, as required, substantially as set forth.

46,366.—Railroad Car Brake.—J. W. Latcher, Northville, N. Y.:

I claim the employment or use of the rocking or oscillating plates, B B, placed on suitable centers, and longitudinally to the truck, and centrally between and in front of the wheels, and actuated by means of the links, C C, toward each other and against the wheels, in the manner and for the purpose substantially as described.

Second, I claim the use of the toggle links, C C, in combination with plates, B B, for the purpose of rocking or actuating the plates, B B, as set forth.

46,367.—Water Wheel.—Joseph F. Letellier, Grand Rapids, Mich.:

I claim a horizontal water wheel, provided with a scroll, having its bottom formed of a spiral plane longitudinally, and inclined transversely, in combination with the inclined buckets of the wheel, all arranged substantially as herein set forth.

[This invention relates to a new and improved water wheel, of that class which are placed on vertical shafts and have the water admitted to them through a scroll, the water acting upon or against the buckets of the wheel, upward from the scroll, the wheel working upon the top of the latter.]

46,368.—Condenser and Refrigerator.—Wm. A. Lighthall, New York City:

I claim the combination of the case, A, tubes, B, and division plates, C, with the nozzles, D and E, for the reception and delivery of the cooling water, and the nozzles, F and G, for the reception and delivery of the injection water, when the said nozzles are arranged in relation to each other, and to the case tubes and division plates, as and for the purpose herein set forth.

46,369.—Stovepipe Thimble.—Thomas M. Lozie, Elmira, N. Y.:

I claim a stovepipe thimble, composed of a series of rings, B C D, and register, E, fitted together by hooks or projections, d e f, and corresponding nicks, d e f, substantially as and for the purposes set forth.

[This invention consists of a thimble, composed of a series of rings, decreasing in size, and a register in the center, fitted together by means of hook projections secured to the inner surfaces of the several rings, and arranged, in combination with nicks, on the inner peripheries of the next preceding rings, in such a manner that when it is desired to remove the register or either of the rings it has to be turned until the projections on its inner surface come opposite the nicks on the inner periphery of the next larger ring, and thereby the thimble can be readily adjusted to pipes of different size, and when no stove is used the register is inserted, and the hole in the wall can be opened or closed, as may be desirable.]

46,370.—Machine for Making Wrought-iron Railroad Chairs.—John H. Malbett, Mechanicsville, N. Y.:

I claim the employment of the said upper and movable die, F, and the said lower and fixed die, E, and said vertical moving center die, C, operating within said fixed die, E, each constructed and combined in the manner and for the purposes substantially as herein described and set forth.

I also claim the said vertical-moving center die, C, in combination with the said lower and fixed die, E, and with the cam, D, in the manner and for the purposes substantially as herein described and set forth.

I also claim the cutting and punching in the said prepared chair plate or bar, the said plate or recess, by means of the said die or punch, e, or its equivalent, so as to allow the said inner and outer lips to be cut, punched, swedged and formed from said chair plate or prepared bar, in a more quick, easy and substantial manner, substantially as herein described and set forth.

I also claim the combination of the cam or eccentric, D, with the moving vertical center punch or die, C, substantially in the manner and for the purposes herein described and set forth.

46,371.—Machine for Rolling Metal.—Henry F. Mann, Pittsburgh, Pa.:

I claim the use of two supporting rolls, or their equivalent, placed with their surfaces in contact with small diameter-working rolls placed above the upper small diameter-working roll, and below the lower one, whether an intermediate roll of larger diameter is used or not, for the purpose of supporting working rolls of small diameter for rolling metallic sheets, bars or plates, substantially in the manner hereinbefore described.

Also the use of two small diameter rolls, in combination with an intermediate roll of larger diameter, the small diameter rolls being supported as hereinbefore described, the term small diameter being used relatively to the diameter of the larger roll, and not as otherwise limiting or defining the diameter of the smaller rolls.

46,372.—Machine for Dressing the Throats in Plane Stocks.—F. B. Marble, Columbus, Ohio:

First, I claim the combination and arrangement of the rotary traveling cutter, N, and oblique adjustable rest and clamp, j t, substantially as and for the purposes described.

Second, The application of the gage, k, to the vertical face of the pivoted rest of a machine for planing the throats of plane stocks, substantially as and for the purposes described.

Third, The rotating planing cutter, N, with cutting edges on its periphery and on its face, arranged and operating substantially in the manner and for the purpose described.

Fourth, The combination in a machine for cutting the throats of plane stocks of the rest, j, gage, k, clamp, t, horizontally adjustable bed, H, vertically adjustable table, G, and a traveling cutter, constructed and operated substantially as described.

Fifth, The pivoted-adjustable clamping rest and gage, j k t, constructed and operated substantially as and for the purposes herein described.

Sixth, The adjustable stop gage, c, applied to a frame, A, in combination with a traveling rotary cutter N, and stock-holding bed, H, substantially as and for the purpose described.

46,373.—Harvester.—Chas. W. and Wm. W. Marsh, Clinton, Ill.:

We claim the scalloped gatherer, D, provided with the hinged extension, d, as described, when used in connection with the band, B, substantially as and for the purpose specified.

We further claim the scraper, E, for the roller, C, when constructed as described, and used with the endless band, B, for the purpose specified.

46,374.—Machine for Hulling and Cleaning Grain.—John M. Mayer, New York City:

I claim the revolving perforated cylinder, A, with circular shelves, E, in combination with the semicircular conduits, d, and case, F, constructed and operating substantially as and for the purposes set forth.

[This invention consists in a revolving wire gauze cylinder, provided with a series of circular rough surface shelves, in combination with an internal fan blower, and with an external case, provided with a series of semicircular conduits, arranged in such relation to the circular rough surface shelves of the wire gauze cylinder that the wheat or other material dropped in the first shelf passes to the second and third, from the third to the fifth, and so forth, and from the second to the fourth, and so on, and in its course over the several rough surface shelves it is thoroughly divested of its peel, and discharged in a comparatively pure state.]

46,375.—Toe Piece for Lasting Machine.—A. S. McIntire and Nathanial Stevens Thompson, Stoneham, Mass.:

I claim the method of forming a toe piece for lasting machines of any suitable material, by means of the lasted shoe and the jaw lasting machine, substantially and for the purpose as herein described.

46,376.—Cultivator.—Elias Minnich, McKee ½ Falls, Pa.:

I claim the arrangement of the braces, M M, connecting the plow shares to the tongue, with the teeth or rake, L, as arranged and combined with the angular-shaped frame, E, as herein described and for the purposes set forth.

46,377.—Mode of Hanging Gates.—Thos. S. Minniss, Meadville, Pa.:

I claim the gate, A, shifting lever, I, and cords, O, the several parts being constructed, arranged and operating as and for the purpose set forth.

46,378.—Gang Plow and Cultivator.—Saml. H. Mitchell, El Paso, Ill.:

I claim the split and expanded draught pole, C, in connection with the axle, A, and bar, E and O, and rods, h, all arranged as and for the purpose herein set forth.

[This invention relates to a new and improved device for plowing, cultivating, etc., and it consists in a peculiar construction of the framing of the machine, and the attachment of the plows thereto, whereby the plows may be readily raised and lowered, or adjusted to penetrate the earth at a greater or less depth, and also raised entirely out of the earth when necessary, and the plowing by its peculiar construction rendered extremely simple and efficient.]

46,379.—Self-setting Animal Traps.—H. B. Myers, Schoolcraft, Mich.:

I claim the combination of the pendulous detent, E, provided with the groove or channel, h i h, and resetting itself by its own gravity, with the fixed bait hook, d, the weighted platform, and the box of the trap, substantially as above described.

[This invention consists in the novel manner of resetting the trap after an animal is caught in it.]

46,380.—Locomotive Head Light.—Thomas J. Newland, Utica, N. Y.:

I claim the combination and arrangement of the barrels or cylinders, A B C and D, used and operating substantially in the manner and for the purpose mentioned.

Second, The beveled ends of the inner cylinder, D, separately and in combination, used and operating substantially in the manner and for the purposes mentioned.

46,381.—Expansible Reed for Warp-dressing and Weaving.—Ambrose J. Nichols, Providence, R. I.:

I claim the combination of the crossbars, c c, and screws, e, with the elastic ribs, a a, and grooved frame, A, all constructed and arranged as and for the purpose herein specified.

46,382.—Picture Frame.—Marcus Ormsbee, New-York City:

I claim the flexible plate forming the back of a picture frame, in combination with the tongues or lips cut out of and made from the back or plate to form attachments or supports to the picture, substantially as herein described.

46,383.—Cultivator.—Ira A. Palmer, Monmouth, Ill.:

I claim, first, The draught equalizer composed of the rods, D D, provided with arms, d d', at their upper and lower ends, and placed at right angles to each other, with the lower arms projecting at right angles from the machine, with the upper arms, d, connected by a rod, E, and the whiffletrees attached to the lower arms, d', substantially as and for the purpose set forth.

Second, Connecting the plow-beams, E, to the bars, e, of the main

frame, A, through the medium of the bars, k, which work on adjustable pins or rods, l, in plates, m, attached to the bars, c, and the pins, j, which pass through plates, i, attached to the plow-beams and through the bars, k, all being arranged substantially as and for the purpose specified.

Third, The particular manner of constructing the main frame, A, to wit, of the side bars, a a, arranged in V form, connected at their upper ends by cross-bars, b b, and mounted on wheels, B, substantially as herein set forth.

[This invention relates to a new and improved cultivator designed more especially for cultivating corn, and it consists in a novel manner of attaching the beam to the implement whereby the corn will not be liable to be bent down and broken by the whiffletrees, and the draught of the two animals equalized. The invention also consists in a novel way of attaching the plow-beams to the main frame of the machine, whereby the two beams may be set or adjusted at a greater or less distance apart as may be desired, and allowing both a lateral and vertical movement.]

46,384.—Manufacture of Sheet Iron.—Daniel L. Pratt, Bridgeport, Ohio:

First, I claim the herein described series of processes, substantially as described.

Second, I claim subjecting the sheet iron, after it has been cleansed of its scale and of the operating chemicals and water, to a bath or coating of oil, which is rolled in cold or at a temperature that will not dissipate the oil.

Third, I claim subjecting the sheet, after it has been removed from the bath of alkaline solution, to the action of revolving brushes, upon each of which a jet or stream of water is thrown.

Fourth, I claim the combination of an organic and mineral acid in the aciduous bath, substantially as described.

46,385.—Retaining and Releasing Hooks.—Thomas E. Purchase, Reading, Pa.:

I claim the within described retaining hook, consisting of a body, A, pawl E, and spring lever, B, all constructed and arranged substantially as set forth.

46,386.—Spinning Machine.—Thomas Pye, New Hartford, N. Y.:

I claim the improvements in the operations of the spinning jack in woolen manufactories, as I have described it, consisting of the levers, a c and d, the slide bolts, n and x, and the lifter, A O., figure 1, the weight and lever, D E, figure 2, and the sheave, t, figure 3, with their connections, adjustment and adaptation, as described, and for the purposes described.

The whole being arranged, combined, and operating substantially in the manner herein set forth.

46,387.—Mode of Curing Tobacco.—Peter Rauch, South Lebanon, Pa.:

I claim the mode and manner of regulating and ventilating the curing of tobacco by the singie or double ventilating boxes and packing, as herein described, and for the purposes set forth.

46,388.—Railroad Rail Joint.—George M. Ramsay, New-York City:

I claim the combination of the miter or lap joint together with the clamp, substantially as described.

Also, making the slot, A a, longer than the union, c, substantially as described.

Also, making the ends, b b, to extend beyond the end of c, substantially as described, for the purposes described.

46,389.—Self-locking Nut.—J. H. Raymond and W. J. Brassington, Brooklyn, N. Y.:

First, We claim the dog, C, so applied within the nut and held in contact with the screw thread of the bolt by a spring that by any tendency to turn the nut in one direction the friction of the said dog on the surface of the said thread is caused to draw its point toward the center of the bolt, and so make it bite the thread at any part of its surface, substantially as herein described.

Second, The hole, e, in combination with the dog, C, and the slot, a, in the nuts, substantially as and for the purpose herein specified.

46,390.—Lithographic Printing Press.—Edwin Reynolds, Mansfield, Conn.

I claim in combination with an oscillating carriage, through which movement is imparted to the stone to ink its surface and to carry it under the tympan and rotation is imparted to the tympan. I claim the construction of the oscillating gears by which the tympan is kept in contact with the stone as they move in juxtaposition, when this construction is combined with mechanism which arrests the motion of the tympan or locks it in position during the back movement of the stone.

Also, the arrangement of the mechanism for connecting the tympan gears with the tympan frame for the forward movement of the stone and disconnecting them for the back movement of the stone, substantially as set forth.

Also, so arranging this clutching mechanism that the tympan frame can be disconnected from the tympan gears for the entire back and forth movement of the stone.

Also, so constructing the tympan frame that while one end of the tympan is stationary with respect to the tympan cylinder, the other end is attached to a yielding bar, for the purposes substantially as described.

Also, constructing the rotary tympan frame with an open space between its two parts, l and k, to permit access to or removal of the scraper when the tympan is in position to bring such space beneath the scraper, substantially as shown and described.

Also, when a series of three or more ink rollers are employed such disposition and application of them with reference to the path of movement of the stone and the position of the main ink cylinder that while the rollers are brought into position to rotate in contact with the flat surface of the stone as it traverses beneath them they shall also be carried at proper times, by a series of concentric bearings into positions around and in contact with the curved surface of the main ink cylinder, substantially as described.

46,391.—Machine for Mortising Plane Stocks.—John Richards, Columbus, Ohio.

First, I claim the combination of an adjustable inclined stock holder, F, with a boring tool which receives a rotary motion and at the same time a vibrating motion, substantially as described.

Second, The construction of the stock support, F, in combination with the bed, G, and camp, S', substantially in the manner and for the purpose set forth.

Third, A gage, p, applied to the face of the stock holder of a machine adapted for cutting the throats in plane stocks, substantially as and for the purpose set forth.

Fourth, The combination of the stock, F, adjustable clamp, s, and rotary auger, substantially as and for the purpose set forth.

46,392.—Machine for Mortising Plane Stocks.—John Richards, Columbus, Ohio.

First, I claim producing the cheeks on each side of the throat of a plane stock by means of a rotary vibrating auger operating in conjunction with a double inclined bed, F, which is adapted for holding the stocks in a proper position to receive the auger, substantially as described.

Second, The stock holding bed, F, constructed with double inclined surfaces, h h', and provided with gages and clamps for holding the work in place during the operation of forming the cheeks, substantially as described.

46,393.—Horse Hay Forks.—John L. Ripley, Fremont, Ohio:

I claim the bolt, E, attached to the spring, H, and having the rod, F, connected to it by a pivot, d, in combination with the inclined plate, i, and the curved part, b, of the bar, D, all arranged to operate substantially as and for the purpose herein set forth.

This invention relates to a new and useful improvement on a horse hay fork, for which Letters Patent were granted this inventor bearing date Sept. 6th, 1864. The object of the invention is to obtain a better lock or fastening for the fork, one which will be less liable to get out of repair or become deranged by use, and capable of being operated with greater facility.]

46,394.—Harvesting Machines.—E. P. Russell, Manlius, N. Y.:

First, I claim hinging the cutting apparatus to the draft frame, by means of an angular draw bar, which answers also as a hinge, i, and brace for the cutting apparatus in combination with the curved sliding hanger, C, the said parts being applied to the draft frame, substantially as shown, for the purpose of rendering a single hinge joint in the cutting apparatus or its connections capable of serving the purpose of what is known as the "double hinges" or "double rule joint," as set forth.

Second, The curved slotted bearing guide, B, constructed in one piece and applied to the main frame as described in combination with the curved stiff hanger, C, arranged and operated as set forth.

Third, The construction of the curved stop tooth, b, formed on the hanger, C, in combination with the curved lip, g', constructed as shown on the shoe, F, substantially as and for the purpose described.

Fourth, The transverse rigid brace and guide, D, in conjunction with the curved hanger, C, and curved guide, B, substantially as and for the purpose set forth.

Fifth, The manner shown of applying the roller, a, within the eye of the curved guide, B, and upon the curved hanger, C, for the purpose set forth.

46,395.—Brazing Brass Screws to Iron Pipes.—Wm. B. Scaife, Pittsburg, Pa.:

I claim as an article of manufacture a tubular coupling in two sections, constructed so as to be screwed together, each section being provided with holes or apertures through which melted solder or other material may be poured in order to cement or permanently attach said sections to the pipes respectively, which are to be coupled together.

46,396.—Photographic Camera Stand.—James Scouler, San Francisco, Cal.:

First, I claim the skeleton platforms, C C', connected to each other by a hinge joint, b, and to the frame, A, by a hinge, a, to operate in combination with the spring pawls, D D', and serrated bars, E E', in the manner and for the purpose substantially as described.

Second, The hand lever, G, and bottom, J, in combination with the platform, C, and pawl, D, constructed and operating substantially as and for the purpose set forth.

The adjustable serrated bar, D', in combination with the platforms C C', and set screw, d, constructed and operating as and for the purpose set forth.

46,397.—Comb for combing Wool, Flax, Cotton, etc.—John B. Siccardi and James Hyde, New York City:

We claim the construction of a comb with metal points or teeth, when said teeth are passed through holes made in the plate, I, and secured at its back by means of a suitable cement, the whole being constructed in the manner substantially as described and specified.

46,398.—Corn-planter.—J. N. Smith, Galva, Ill.:

I claim attaching the frame carrying the furrowing device and seed boxes to the forward end of the pivoted frame, A, so that by the forward or rear movement of the driver's seat by means of the lever g, crank shaft, p, and carriage m, the weight of the driver may be made to partially counterbalance the weight of the forward frame and modify the depth of the furrow.

[This invention relates to an improvement in that class of corn-planters which open their own furrows by means of runners, and in which the depth of the furrows is regulated by the position of the driver's seat, which can be adjusted backward or forward.]

46,399.—Brick Machine.—Josiah T. Smith, Springfield, Ill.:

First, I claim the combined arrangement of the pulverizers, molds, or plungers, and the cam motion, for the purposes as substantially set forth.

Second, Discharging the brick from the molds downward, being the mode in which they are pressed, thus avoiding derangement in the particles of clay, leaving the brick as smooth and perfect as when pressed.

Third, The movement of the bottom across the face of the plungers, removing the brick, and perfectly cleansing the face of the plungers of any particles of clay which might adhere to them.

46,400.—Machine for Stretching Paper Collars.—Chas. Spofford and W. S. Bell, jr., Boston, Mass.:

We claim the sliding carriage, E, with its curved recess, d, in combination with the stationary block, I, and cylinder, L, operating substantially as set forth for the purpose specified.

46,401.—Milling Machine.—Edwin C. Stiles, Portland, Me.:

First, I claim producing an elastic bearing for the counter die, C, or its equivalent, by means of the spring, J, and its set screw, d, substantially as described.

Second, In machines for milling screw heads and other articles causing the curved face of the vibrating die, B, to operate in connection with the concave face of the adjustable counter die, C, substantially as described.

[In all milling tools and machines heretofore known, the work or article to be operated upon is rotated by a lathe or other means, and the milling tool revolves in contact with the work. By this invention the article to be milled is received and operated upon by the tool without the application of power to the article, thereby doing better work and in a different and more simple mode, and at less cost.]

46,402.—Burglar-alarm.—Bernhard L. Stone, San Francisco, Cal.:

I claim the arrangement of the hammers, B and C, the invention of lever, G, and spring, H, as arranged, together with the arrangement of the triangle, I, as attached to lever wire, G, and extending from one end of the triangle, I, and a wire or cord, Q, which is fastened to the other end of the triangle, I, and extends to cap, K, which also I claim as my invention, together with the arrangement and operation of the spring door bolt, L, which by throwing off the cap, K, sets the alarm in operation. The alarm continues until the machine runs down.

46,403.—Water Elevator.—Asahel Tarbox, Willimantic, Conn.:

I claim, first, The combination with a rotating shaft of a loose crank which can be alternately connected with and disconnected from the shaft on which it is hung by means of its enlarged eye and a dog on the side of the crank, substantially as above described.

Second, In combination with a crank constructed and operating as above described, the brake apparatus, consisting of the lever, D, its detent, D2, its brake, D1, and the ratchet wheel, a, and friction ring, b, substantially as above set forth.

46,404.—Cigar Machine.—J. Thompson, New York City:

I claim the adjustable mold, C, in combination with the longitudinally sliding revolving fork, D, constructed and operating substantially as and for the purpose set forth.

46,405.—Mode of Manufacturing Paper Twine.—Isaac P. Tice, New York City:

I claim the manufacture of paper twine by twisting the paper in a dry state, afterward moistening it, and subjecting it to a stretching operation while in a moist state, substantially as herein described.

46,406.—Mop.—George W. Tolhurst, Circleville, Ohio:

I claim the combination of the handles, A A', cross pieces, B B', and brace, D, substantially as specified.

46,407.—Machine for Polishing Marble.—Asa M. Tomb, Lyons, N. Y.:

I claim the combination and arrangement of the sliding block, K, way, G, shaft, L, double pulleys, n n, and the band, F, wound around said pulleys on opposite sides in such a manner that while said sliding block is allowed a free reciprocating motion without unusual friction the shaft is revolved by the band substantially as herein set forth.

I also claim the hinged way, G, so arranged as to swing aside to enable the stone to be adjusted on the carriage and to serve as the guide to the sliding block, K, substantially as herein described.

I also claim the polishing device consisting of the head, M, radical arms, s s, and jaws, t t, so arranged that each set of jaws can be adjusted at varying distances from the head substantially as and for the purpose herein specified.

Also claim connecting the head, M, with the shaft, L, by means of the depressions, q q q, and arms, o o, in such a manner as to produce a free joint so that the polishing device will adapt itself to the surface of the stone substantially as herein described.

I also claim shifting the engagement of the pinion, f', with the pinion, g' h', by means of the bar, N, provided with cam, l', the dogs, o o, and the shaft, k', provided with the pins, r, crank and weight, n' o', and cams, m' m', the whole arranged, combined and operating substantially as herein set forth.

I also claim the holes, s' s', in the carriage, B, and the shifting pins, u' u', when used in combination with the rack, r', pinion, q', and shaft, k', for gaging the stroke of the carriage to the length of the stone substantially as herein set forth.

46,408.—Shoe String.—Wm. H. Towers, New York City:

I claim the improved shoe string or lacing made from raw or untanned hide, with the ends made impervious to moisture and pointed ready for use, substantially in the manner and for the purposes above described.

46,409.—Method af Finding Waist and Chest Measurement of Ladies' Dresses.—M. M. Turner, North Fairfield, Ohio:

I claim the method of finding the waist and chest measurement substantially as described.

46,410.—Knapsack Slings.—J. T. Warren, Stafford, N. Y.:

I claim the arrangement and construction of the metallic slings E E, with their yielding straps, D D, and back strap, G, as herein described and for the purposes set forth.

46,411.—Cartridge Box.—Martin V. P. White, Troy, N. Y.:

I claim the employment of the apron, E, with the vertical end piece, I, thereto attached in combination with the inner box, B, and the coil spring, D, in the manner and for the purposes substantially as herein described and set forth.

I also claim the employment of the inner case, B, in combination with the outside case, A, substantially as and for the purposes herein described and set forth.

I also claim the removing of cartridge from the one end of the cartridge box in the manner and by the means substantially as herein described and set forth.

46,412.—Wheeled Plow.—Richardson Wilson, Fowler, N. Y.:

I claim the farrangement of the vertical adjustable supports D J, with regard to the beam, E, and the axles of the supporting wheels, A H, as and for the purpose herein described and represented.

46,413.—Graduated Dumb Bells.—Geo. B. Winship, Boston, Mass.:

I claim, first, constructing graduated dumb bells of flat discs or sections substantially as and for the purpose described.

Second, Fixing the two inmost discs, I I, upon the handle, A, by means of the holes, e, and the imbedded stationary pins, c c, substantially as described.

Third, The method of confirming the removable discs or sections, by means of the spring pins, D, and holes, b, substantially as and for the purpose described.

Fourth, Constructing the handle, A, of a dumb bell of a hollow metallic cylinder, substantially as set forth and for the purposes described.

46,414.—Stove pipe Ventilator and Draught Damper.—Gurdon G. Wolfe, Troy, N. Y.:

I claim the employment and combination of the vertical register, C, with the damper, E, in the manner substantially as herein described and set forth so that the same may together be operated independent of and separate from or with the register, C3, in the manner and for the purposes herein described and set forth.

46,415.—Paper Files.—Wm. L. Words, Washington, D. C.:

I claim the file box, figures 1 and 2, in its combination with pigeon holes or shelves in vaults, safes and portable cases substantially as set forth and described above.

46,416.—Steam Trap.—L. W. Woodward, North Adams, Mass.:

I claim the steam trap constructed and operating substantially as above described.

[This invention consists in a novel construction of steam traps in which the opening and closing thereof is caused by the alternate expansion and contraction of the pipe which forms the connection between the steam apparatus to be cleared of the water of condensation and the trap.]

46,417.—Breech-loading Ordnance.—Theodore Yates, U. S. A., Milwaukee, Wis.:

I claim the combination of the lever, C C, cap, D, and sliding breech block, D, constructed and operating substantially as and for the purposes herein described.

46,418.—Plow.—Wm. B. Young, Chicago, Ill.:

I claim a plow standard made of sheet iron or steel with the upper part bent or curved constructed and operating substantially as above described.

46,419.—Sugar Boiling.—Edward Beans, London, Eng., and Conrad Wm. Finzel, Bristol, Eng., assignors to themselves and Theo. A. Havemyer, New York City:

We claim the employment or use in boiling sugar in vacuum pans of hot water at or as near as may be to the boiling point or steam of a pressure of not more than one pound to the square inch or as near as may be to that pressure substantially as herein set forth to prevent carbonization and coloring of the saccharine liquids and of the sugar

[This invention consists in the use of hot water, or as near as may be, to the boiling point, or of steam at a very low pressure, for the purpose of boiling sugar in vacuum pans.]

46,420.—Well Boring Apparatus.—Charles E. Foster, Philadelphia, Pa., assignor to the Rock Drill & Mining Company, Penn.:

I claim, first, The combination substantially as described, of one or more direct acting steam or compressed-air cylinders with a plate carrying the levers, h, or their equivalents, and with a boring bar for the purpose specified.

Secondly, The combination of the cylinder, C, trunk, D, levers, h, or their equivalents, and bar, F.

46,421.—Machine for Straightening Elliptic Springs.—James W. Gray and Charles H. Curtis, (assignors to themselves and the Spring Perch Company,) Bridgeport, Conn.:

We claim, first, the combination of the sliding plate, a, and the joint, d, with the table, A3, and its rim, f, constructed and operating substantially as and for the purpose above described.

Second, The combination of the levers which operate the jaw, d, and sliding plate, a, with the cams, C C, and the spring, E, or its equivalent all constructed substantially as above described.

[The object of this invention is to produce a machine which will straighten the leaves or plates of carriage-springs, after they have been wrought or rolled out, by a single operation.]

46,422.—Improved Stove.—R. Little, (assignor to himself and Samuel Little,) Canton, Ohio:

I claim the application to stoves of the removable lining plates, B, substantially as and for the purposes described.

I also claim the removable side linings, B, in combination with the closed sides, C, of the stove substantially as herein described.

I also claim the combination of the removable linings, B, of the stove with reflecting surfaces, S, for the purpose of concentrating the heat on the stove substantially as herein described.

46,423.—Furnace Doors for Boilers.—James Penketh, (assignor to himself and John E. Eastman,) Chicago, Ill.:

I claim constructing the furnace doors of steam boilers by turning the boiler plate inwards and the furnace plate outward and lapping and riveting said plates together substantially in the manner and for the purpose herein specified and shown.

47,424.—Sewing Machine for Making Band Ruffling.—Thomas Robjohn, (assignor to E. C. Wooster,) New York City:

I claim, first, The combination with each other and with a sewing machine, of a guide for turning in the edges of and folding one strip of cloth to form a double band, a guide for guiding another strip of cloth into such band to form a ruffle, and a plaiting or ruffling knife, the whole operating substantially as herein specified.

Second, In combination with the ruffling knife acting above the strip which is to form the ruffle I claim the extension of a portion of the bottom, l, of the guide, F, or its equivalent below the said knife in such position as to be interposed between the ruffle strip and the lower part of the band substantially as and for the purpose herein specified.

46,425.—Sawing Machine.—C. B. Rogers, (assignor to C. B. Rogers & Co.,) Norwich, Conn.:

I claim, first, So arranging the feed rollers, C C, in movable frames, a a, and applying a screw rod to operate upon these frames that the rollers can both be adjusted together in a plane parallel to that of the saw the parts being constructed, arranged and operated substantially as described.

Second, The combination of pivoted arms, d d, sliding cross head, b', and adjusting screw, o, with feed rollers which are supported in adjustable frames, a a, substantially as described.

Third, The spring, f, and the frames, a' a', of the pressure rollers, D D, in combination with the adjusting screw, e', and slide, e, substantially as and for the purposes described.

Fourth, Providing for the use of circular saws of different diameters by mounting the saw arbor upon a longitudinally adjustable frame, H, constructed, arranged and operating substantially as described.

Fifth, The adjustable saw arbor, G, in combination with feed rollers, C D, all arranged substantially as and for the purposes described.

Sixth, Adjustable guide, F, or its equivalent in combination with the adjustable saw arbor, G, substantially as described.

46,426.—Neck-tie Supporters.—George K. Snow, (assignor to himself and "March, Bros., Pierce & Co."), Watertown, Mass.:

I claim the said bow or scarf supporter as composed of the bow attachments, a a, the button socket or saddle, b, and the elastic arms, c c, the whole being made of wire or its equivalent substantially as specified.

46,427.—Boot Crimping Machine.—John S. Landes, (assignor to himself and Henry G. Halbach,) Lancaster, Pa.:

I claim the construction and arrangement of the pieces, B C, connected by a hinge, a b c, to the central projection, a, on the base piece, A, with the two handled screws, F G, in A, acting on said pieces, B C, respectively.

I also claim the pieces, B C, and their hinged attachment to A, in combination with their sheet iron plates, D E, and their attachments respectively in manner shown, for operating upon the leather held by the clamps, L' L'' L''', by means of the handled screws, F G, all arranged and operating substantially in the manner set forth for the purpose specified.

46,428.—Sawing Machines.—Charles P. Wiggins, (assignor to Case, Marsh & Co.,) Indianapolis, Ind.:

I claim the adjustable slide, E, when connected to guide bar, D, and constructed to operate substantially as described.

46,428.—Water Wheel.—Joab H. Wooster, Strykersville, N. Y., assignor to himself and Robert Dunbar, Buffalo, N. Y.:

I claim, first, A water wheel bucket having partitions, C, for the purposes and substantially as described.

Second, The combination and arragement of the shaft, J, including the step, J', with the solid shaft, F, and a hollow shaft, F', for the purpose of locating and supporting the step, J', above the water substantially as herein described.

46,430.—Governor for Water Wheel Gates.—Joab K. Wooster, Strykersville, N. Y., assignor to himself and Robert Dunbar, Buffalo, N. Y.:

I claim a belt of varying width running over three pulleys located in close proximity to each other on one shaft, the middle pulley being loose on the shaft, and the two out ide being made fast on the shaft; and which shaft is by means of rack and and pinion, or other suitable device, connected with a water wheel gate, and a "governor" of ordinary construction, so that the governor will control the movements of the gate, to admit a greater or less quantity of water upon the wheel substantially as described.

46,431.—Process for Improving the Color of Molasses.—John Von Bohm, Melbourne, Australia:

I claim the employment of tannin, substantially as herein described, in the purification of molasses.

46,432.—Apparatus for Carbureting Air.—Wm. Henry Buckland, London, Eng. Patented in England, March 5, 1863:

I claim the gas apparatus herein represented and described consisting of the reservoir, a, false bottom, b, perforated partition, e e, covered with fibrous material, inlet aperture, f, and exit g, all constructed, arranged and operating as specified.

46,443.—Looms for Weaving Double Faced pile Fabrics. Pierre Joyot, Junior, Paris, France:

I claim in the manufacture of a double faced fabric or tissue presenting either a cut or non-cut pile velvet on part or on the entire of both surfaces of the fabric or tissue—the application instead of the ordinary pile wires, of double pronged forks, one prong or more of which serves for forming the upper and the other prong for forming the lower pile, the said prongs or wires being either provided with a cutting edge or not and the forks being moved automatically by the loom substantially as set forth.

46,434.—Machine for Heading Bolts.—F. Watkins, London Works, Birmingham, Eng.:

I claim, first, The employment or use of a vertical slide or slides carrying at their lower ends changable dies which are provided with cavities in their lower surfaces corresponding with the size and form of the heads required.

Second, The use of a movable carriage or carriages, containing changeable and adjustable heading tools, which are provided with holes, or sockets corresponding with the body or shank of the bolt, arranged in combination with the hand levers or other equivalent device, substantially in the manner herein specified so that the operator working the machine may conveniently place the blank or remove the bolt, spike or rivet, when completed.

Third, The arrangement of levers substantially such as herein shown and described for the purpose of partly removing the articles from the heading tools after the same have been operated upon by the header.

Fourth, The application of india-rubber or other suitable springs, substantially as described for the purpose of furnishing a yielding bearing, necessary for the safe working of the machine.

Fifth, Making the heading tools and dies of cast iron with chilled surfaces.

RE-ISSUES.

1,868.—Machine for Hulling Clover.—Emma A. Blackwell, Ovid, N. Y., administratrix of the Estate of Ishi V. Blackwell, deceased. Patented March 30, 1858.

I claim, first, The construction of the grinding surfaces of clover machines with teeth made and case-hardened substantially as described.

Second, The application of the gravitating curtain, H, at the point of eduction of the blast for the purpose of modifying and diffusing the same and preventing the waste of seed substantially in the manner shown and described.

Third, The combination and arrangement of the overshot grating cylinder, C, constructed as described, with the concave, E, feed roller, D, and blast generator, G, the whole operating conjointly in the manner and for the purpose herein described.

1,869.—Hay Elevator.—F. F. Fowler, Crane Township, Ohio. Patented April 17, 1860. Re-issued Sept. 9, 1862:

I claim, first, In the construction of elevators for hay, the combination of the permanent pyramidal supporting frame and the revolving cross-bar and its braces, with a central supporting piece, for allowing the cross bar and its braces, to turn upon the supporting frame, substantially in the manner and for the purposes described.

Second, In the construction of elevators for hay, I claim in combination with the cross bar revolving upon an under supporting frame, the so arranging of the sheaves and hoisting tackle, that the weight to be raised shall be upon one end of the cross bar, whilst the power to raise that weight is applied to the opposite end of the cross bar, for the purpose of enabling me to use a small and compact structure that may be easily transported, or moved, occupying but little space, and sufficiently rigid within itself without the use of additional guys, braces, or other fastenings as herein described.

Third, In the construction of elevators for hay, I also claim two pyramidal frames, one placed upon the other, the under frame being upright, and the upper one inverted, and the head blocks, or pieces of both so united as that the upper frame may freely turn upon, whilst it is supported by the lower frame, substantially as described.

1,870.—Canceling Stamp.—John W. Foster, Washington, D. C. Patented Jan. 3, 1865:

I claim a canceling stamp provided with an annular cutter, C, and an internal gage, B, either one or both adjustable in relation to each other, substantially as and for the purposes set forth.

Second, I claim the combination of the double set screws, E F, with the cutter, C, and gage B, for the purpose specified.

Third, I claim the adjustable blocks, H H, operated by the screw, J, and employed to lock the type of the stamp, substantially as set forth.

1,871.—Hay Elevator.—F. F. Fowler, Crane Township, Ohio. Patented April 17, 1860. Re-issued Sept. 9, 1862:

I claim, first, So constructing a machine for elevating hay, or other like products that the same power employed in elevating said products will also revolve the top of the machine, while the load is being elevated, or when high enough to pass over the top of the stack, and so that it may be raised from either, or any side of the machine and deposited on the stack, at any other side, and wherever desired, substantially as described.

Second, An elevation, or crane, when conducted as herein described, in combination with a device for grasping hay, or other products, and depositing it upon a stack, substantially as described.

1,872.—Hoop Skirt.—Sarah A. Moody, New York City. Patented May 10, 1864:

I claim a hoop skirt having any number of its lower hoops divided and jointed on each side with flexible joints, substantially as and for the purposes herein described.

1,873.—Chair Seat.—Henry J. Seymour, Troy, N. Y., assignee of Robert Wood, West Troy, N. Y. Patented March 29, 1864:

I claim chair seats and chair backs made substantially as described, as a new article of manufacture.

1,874.—Tempering Wire.—Henry Waterman, Brooklyn, N. Y. Patented Aug. 24, 1858.

I claim the process, substantially such as herein described, of hardening steel wire or other thin steel of any desired length, which process consists in drawing the wire continuously, whilst under tension through the heating medium and thence through the hardening liquid.

DESIGNS.

2,031.—Burial Case.—F. H. Stickney, East Cambridge, Mass.



PATENTS

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FOR SEVENTEEN YEARS.

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CHAS. MASON.

Judge Mason was succeeded by that eminent patriot and statesman, Hon. Joseph Holt, whose administration of the Patent Office was so distinguished that, upon the death of Gov. Brown, he was appointed to the office of Postmaster-General of the United States. Soon after entering upon his new duties, in March, 1859, he addressed to us the following very gratifying letter.

MESSRS. MUNN & CO.:—It affords me much pleasure to bear testimony to the able and efficient manner in which you discharged your duties as Solicitors of Patents, while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and I doubt not justly deserved) the reputation of energy, marked ability, and uncompromising fidelity in performing your professional engagements.

Very respectfully, your obedient servant,

J. HOLT.

Hon. Wm. D. Bishop, late Member of Congress from Connecticut, succeeded Mr. Holt as Commissioner of Patents. Upon resigning the office he wrote to us as follows:

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WM. D BISHOP.

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Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a written reply, corresponding with the facts, is promptly sent, free of charge. Address MUNN & CO., No. 37 Park Row, New York.

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Persons desiring to file a caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. The Government fee for a caveat is $10. A pamphlet of advice regarding applications for patents and caveats is furnished gratis, on application by mail. Address MUNN & CO., No. 37 Park Row, New York.

REJECTED APPLICATIONS.

Messrs. MUNN & CO. are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of their Washington Agency to the Patent Office affords them rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Their success in the prosecution of rejected cases has been very great. The principal portion of their charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted, are invited to correspond with MUNN & CO., on the subject, giving a brief history of the case, inclosing the official letters, &c.

FOREIGN PATTENS.

Messrs. MUNN & CO., are very extensively engaged in the preparation and securing of patents in the various European countries. For the transaction of this business they have offices at Nos. 66 Chancery lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. They thing they can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through their agency.

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Circulars of information concerning the proper course to be pursued in obtaining patents in foreign countries through MUNN & CO'S Agency, the requirements of different Government Patent Offices, &c. may be had, gratis, upon application at the principal office, No. 37 Park Row, New York, or any of the branch offices.

HOW TO MAKE AN APPLICATION FOR A PATENT.

Every applicant for a patent must furnish a model of his invention if susceptible of one; or, if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them, and sent, with the Government fees, by express. The express charge should be pre-paid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by a draft on New York, payable to the order of Messrs. MUNN & CO. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park Row, New York.

Patents are now granted for SEVENTEEN years, and the Government fee required on filing an application for a patent is $15. Other changes in the fees are also made as follows:—

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On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
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SEARCHES OF THE RECORDS.

Having access to all the official records at Washington, pertaining to the sale and transfer of patents, MESSRS. MUNN & CO., are at all times ready to make examinations as to titles, ownership, or assignments of patents. Fees moderate.

INVITATION TO INVENTORS.

Inventors who come to New York should not fail to pay a visit to the extensive offices of MUNN & CO. They will find a large collection of models (several hundred) of various inventions, which will afford them much interest. The whole establishment is one of great interest to inventors, and is undoubtedly the most spacious and best arranged in the world.

MUNN & CO. wish it to be distinctly understood that they do not speculate or traffic in patents, under any circumstances; but that they devote their whole time and energies to the interests of their clients.

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Many valuable patents are annually expiring which might readily be extended, and if extended, might prove the source of wealth to their fortunate possessors. Messrs. MUNN & CO. are persuaded that very many patents are suffered to expire without any effort at extension, owing to want of proper information on the part of the patentees, their relatives or assigns, as to the law and the mode of procedure in order to obtain a renewed grant. Some of the most valuable grants now existing are *extended patents*. Patentees, or, if deceased, their heirs, may apply for the extension of patents, but should give ninety days' notice of their intention.

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ASSIGNMENTS OF PATENTS.

The assignment of patents, and agreements between patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park Row, New York.

UNCLAIMED MODELS.

Parties sending models to this office on which they decide not to apply for Letters Patent and which they wish preserved, will please to order them returned as early as possible. We cannot engage to retain models more than one year after their receipt, owing to their vast accumulation, and our lack of storage room. Parties, therefore, who wish to preserve their models should order them returned within one year after sending them to us, to insure their obtaining them. In case an application has been made for a patent the model is in deposit at the Patent office, and cannot be withdrawn.

It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with patent property or inventions to call at our extensive offices, No. 37 Park Row, New York, where any questions regarding the rights of Patentees, will be cheerfully answered.

Communications and remittances by mail and models by express (prepaid) should be addressed to MUNN & CO. No. 37 Park Row, New York

Notes and Queries

E. J. B., of Ohio.—The pictures that made their appearance on your friend's ambrotype plates were simply latent images which had been previously taken on the same plates. He had not cleaned his plates thoroughly. The occurrence is quite common, and has been fully discussed in our columns.

R. B., Ind.—Take white lead and put red lead enough to make a stiff dough and you will have a good joint for steam or hot water. The joint must be faced true, however.

J. & S., of Conn.—You can stain wood black by soaking it in black ink. But if you wish a finished surface you must cover the wood with black varnish and then polish.

B. W., of Mo.—There are few if any positions so free from creeks, ravines and hills that a battery plated proof against heavy ordnance could be transported to the front of our lines.

S. D. R., of Tenn.—A gallon, wine measure, contains 231 cubic inches, and a cubic foot of water weighs 62½ pounds; therefore a gallon of water weighs 8 34 pounds. A horse power is produced by the fall of 33,000 pounds one foot per minute. Consequently with a fall of 30 feet, to obtain 10-horse power you must have a flow of 11,000 pounds of water per minute, which is equal to 1,319 gallons.

H. H. S., of N. Y.—We are not certain that we understand your magnet apparatus; if we do we should suppose that the attraction of the surrounding wires for the permanent magnet would be far stronger than for the second bar, and that the tendency would therefore be to hold the bars still.

W. D., of N. Y.—There are two processes for purifying tin from iron and other metals, but neither is sufficiently cheap and simple to be practiced on a small scale, and you may be sure that tin of any respectable brand has been subjected to one or the other.

E. L. N., of N. J.—Lead placed in distilled water is converted into white lead, which is a carbonate. The change is doubtless effected by the joint action of the water and the carbonic acid which it contains. Priestly lived in Northumberland, Pa., where he died February 9, 1804. He left a son, who continued his autobiography, which was published with his works by John Rutt, in 1817.

G. P. F., of Minn.—Bourne's Catechism is a good book for you. Also King's Notes on the Steam Engine. The latter is the best. You can't learn to be a machinist from a book.

Money Received

At the Scientific American Office, on account of Patent Office business, from Wednesday, February 8, to Wednesday, February 15, 1865:—

A. K., of N. Y., $25; C. Van H., of N. Y., $12; A. T., of N. Y., $25; B. H., of N. Y., $30; J. S., of N. Y., $25; F. K., of N. Y., $25; L. D., of N. Y., $25; J. B., of N. Y., $25; J. M. C., of N. Y., $25; G. W. B., of N. Y., $35; D. A. D., of N. Y., $25; E. H., of N. Y., $25; G. H. G., of N. Y. $40; G. M. W., of N. Y., $30; W. A. O., of N. Y., $25; S. S. S., of N. Y., $25; E. R. W., of N. Y., $25; R. G., of N. Y., $25; W. H. P., of N. Y., $30; C. B., of N. J., $20; G. T., of N. Y., $15; G. F., of N. Y., $35; J. J. S., of Conn., $20; T. J. L., of R. I., $20; E. C., of N. Y., $45; G. G., of Pa., $45; T. & T., of Mass., $20; J. G. S., of Mass., $20; W. D. K., of N. Y., $22; G. W. H., of N. Y., $40; J. B., of N. Y., $20; J. B. C., of N. Y., $15; P. C., of N. Y., $40; J. W. B., of N. Y., $40; F. M. G., of N. Y., $20; J. H. W., of N. Y., $20; H. S. McK., of Pa., $20; I. N. S., of N. Y., $15; S. & H., of Mass., $20; T. W. H., of Wis., $20; S. C. B., of N. Y., $20; A. H. S., of N. Y., $20; L. S., of N. Y., $35; G. H. & G., of Iowa, $20; L. D. H., of Ill., $20; W. K. L., of Mass., $20; O. W. K., of Wis., $20; R. B. P., of Pa., $20; J. W. C., of N. Y., $22; B. M. S., of N. Y., $16; J. S. G., of Pa., $22; M. & H., of N. J., $20; J. A. B., of Ind., $15; H. H., of N. Y., $45; J. A. M., of N. Y., $15; A. S. L., of N. Y., $45; A. W., of N. Y., $15; W. J. & R. C., of N. Y., $22; H. A. R., of N. Y., $20; G. W. S., of Pa., $20; L. E., of N. Y., $15; L. M., of Wis., $20; E. P., of N. Y., $22; C. B. G., of Iowa, $20; E. P. S., of Mass., $20; J. L. H., of Conn., $20; T. L. S., of Mass., $20; J. P. B., of Conn., $15; E. J. W., of N. Y., $40; J. B., of N. Y., $15; E. H., of N. Y., $20; B. & S., of Mass., $21; J. W. N., of Conn., $81; E. B. T., of N. Y., $20; W. N. B., of Ill., $45; W. A. D., of N. Y., $20; E. P. B., of Pa., $20; I. & W., of Ill., $20; C. E. R., of N. Y., $20; G. & H., of Conn., $45; C. W. C., of N. Y., $10; M. W., of N. Y., $15; A. T. S., of Cal., $20; T. H. W., of N. H., $25; J. W., of Cal., $25; R. R., of N. Y., $15; G. L. D., of N. Y., $25; W. B. P., of Mo., $15; J. W. A., of N. H., $25; E. McK., of Pa., $16; W. S., of N. Y., $20; G. W. S., of Pa., $17; W. S. R., of Conn., $25; J. H. P., of N. Y., $150; H. H., of Wis., $10; T. S. La F., of N. Y., $16; F. J. C., of Pa., $25; S. H., of Mich., $10; S. S., of Ill., $16; R. V. J., of Ohio, $16; F. G., of Pa., $15; L. V., of Wis., $15; T. S., of Conn., $25; G. F. W., of Mass., $15; R. M., of C. W., $31; J. E. M., of Wis., $30; W. K., of Wis., $25; D. E. R., of Mich., $15; L. B. D., of R. I., $16; W. F., of Mich., $15; S. & S., of N. J., $16; H. H., of Mich., $10; G. E. S., of Mass., $25; C. D. W., of Conn., $25; D. & M., of Ill., $10; L. E. H., Jr., of Pa., $16; J. M. L., of Ohio, $20; E. G. N., of Ohio, $16; J. P. D., of Conn., $32; W. O. H., of N. J., $25; G. L. S., of Mass., $15; H. J., of Me., $12; B. M., of Pa., $35; E. W. G., of Mass., $35; H. L. H., of Cal., $30; J. S. F., of Nevada, $103.

Persons having remitted money to this office will please to examine the above list to see that their initials appear in it, and if they have not received an acknowledgment by mail, and their initials are not to be found in this list, they will please notify us immediately, stating the amount and how it was sent, whether by mail or express.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office, from Wednesday, Feb. 8, to Wednesday, Feb. 15, 1865:—

B. & S., of N. Y.; A. K., of N. Y.; C. Van H., of N. Y.; A. T., of N. Y.; B. O., of N. Y.; J. S., of N. Y.; F. K., of N. Y.; L. D., of N. Y.; J. B., of N. Y.; J. M. C., of N. Y.; G. W. B., of N. Y.; D. A. D., of N. Y.; E. H., of N. Y.; G. H. G., of N. Y.; G. M. W., of N. Y.; W. A. O., of N. Y.; S. S. S., of N. Y.; E. R. W., of N. Y.; R. G., of N. Y.; W. H. P., of N. Y.; H. L. H., of Cal.; F. J. C., of Pa.; G. D. D., of N. Y.; W. S. R., of Conn.; C. P., of Mich.; J. W. A., of N. H.; G. D. G., of N. Y.; R. M., of C. W. (2 cases); G. E. S., of Mass.; C. D. W., of Conn.; W. & H., of N. J.; H. J., of Ind.; I. G. J., of Ill.; J. P. D., of Conn.; P. C., of N. Y.; J. W. B., of N. Y.; L. S., of N. Y.; E. F., of N. Y.; E. J. W., of N. Y.; B. & S., of Mass.

TO OUR READERS.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and enclosing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1853, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

MODELS are required to accompany applications for Patents under the new law, the same as formerly, except on design patents, when two good drawings are all that are required to accompany the petition, specification and oath, except the Government fee.

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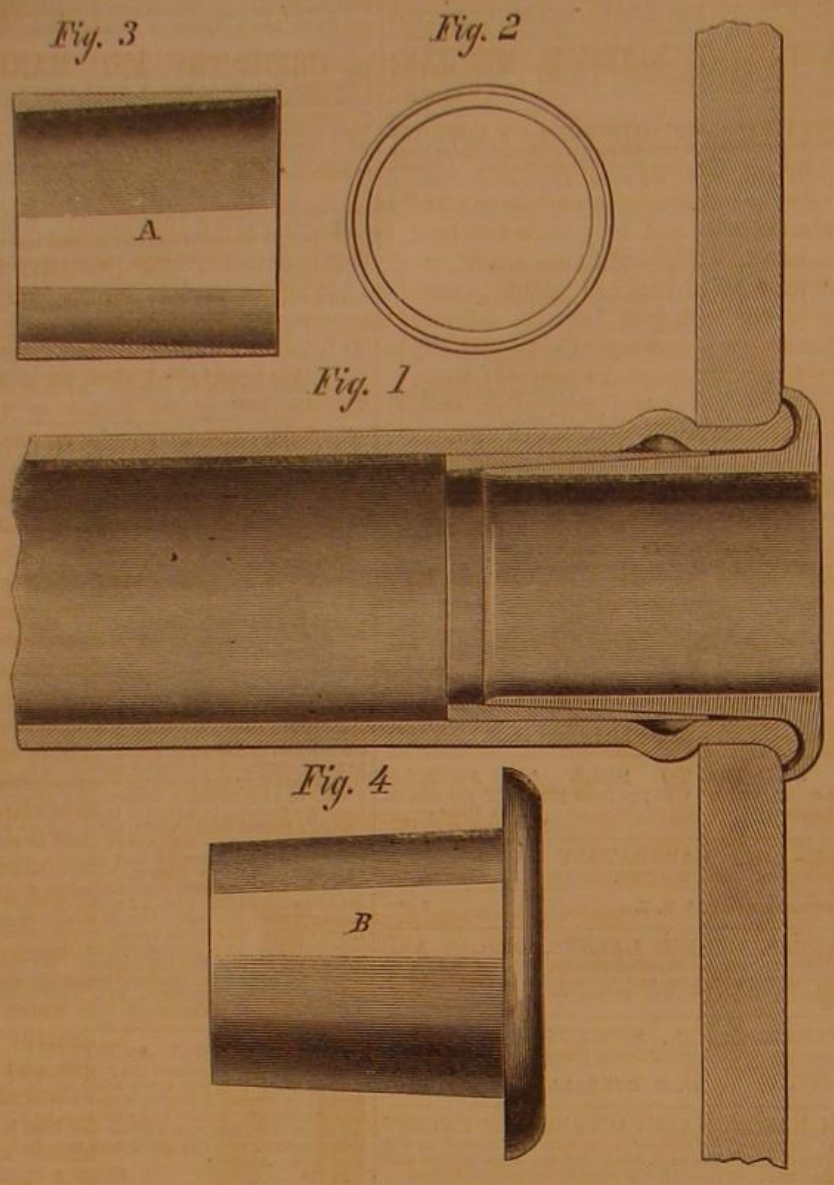
Thimble for Boiler Tubes.

The several engravings herewith presented illustrate a thimble or ferrule for the tubes of steam boilers.

Fig. 1 represents the combined ferrule in place, the object being to prevent leakage and guard against the evils resulting from expansion and contraction of the tube ends when hot and cold alternately.

stopped. The tube will never after require calking, and may always be kept tight by this method. These ferrules do not interfere with sweeping the tubes at any time. They have been in use on the steamers *Atlantic*, *Baltic*, *Ericsson* and many others; the engineers of these ships testify that they are extremely useful and have given great satisfaction.

These thimbles are made to any required size at short notice, and the invention was patented through the Scientific American Patent Agency, by Edward Clark, of New York city, on the 1st of Sept., 1863.



CLARK'S THIMBLE FOR BOILER TUBES.

The common thimbles used for this purpose are of cast iron and in a single piece; these are of iron or brass, generally iron, and effect the object much more perfectly by expanding the tube equally on both sides of the sheet. The several figures, 2, 3 and 4, show the inside and outside ferrules—one slipping within the other in an obvious manner. When a leak is found in the boiler the practice is to slip the inner ferrule, A, in the tube, previously coating it with cement composed of white and red lead. The outer thimble or gland, B, is then put in and driven home, when the tube is quickly expanded and the leak



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This implement is designed to cultivate growing crops of corn, cotton or other plants, with great facility and rapidity. The simple means through which the cultivator can be gaged to work at any desired depth, and managed so as to run close to the plant renders this machine a desirable one for all purposes where such implements are used.

The following details will render it intelligible to all. The cultivators, A, are attached to beams, B, which are jointed to the upper or main frame, C. To the beams the uprights, D, are secured, passing through mortises in the main frame. These uprights have a series of holes in them to receive pins, and there are blocks, E, on the frame which the pins rest on, and thus carry the uprights, beams, and all belonging thereto.

The back ends of the cultivator beams are supported by chains, F, which pass over pulleys on the under side of the frame, and there are treadles, G, on which the driver rests his feet and controls the movements or direction of the shovels. By this arrangement a very simple and satisfactory implement is produced. The inventors say it has been tested and found to work admirably; its freedom from complexity, and capacity for easy and thorough work, are such that they are not afraid to put it in the field to compete with any other. It was patented on the 10th of January, 1865, through the Scientific American Patent Agency, by W. D. Ament, of Muscatine, Iowa. For further information address Ament & Brother at that place.

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Vol. XII.—No. 10. (NEW SERIES.)

NEW YORK, MARCH 4, 1865.

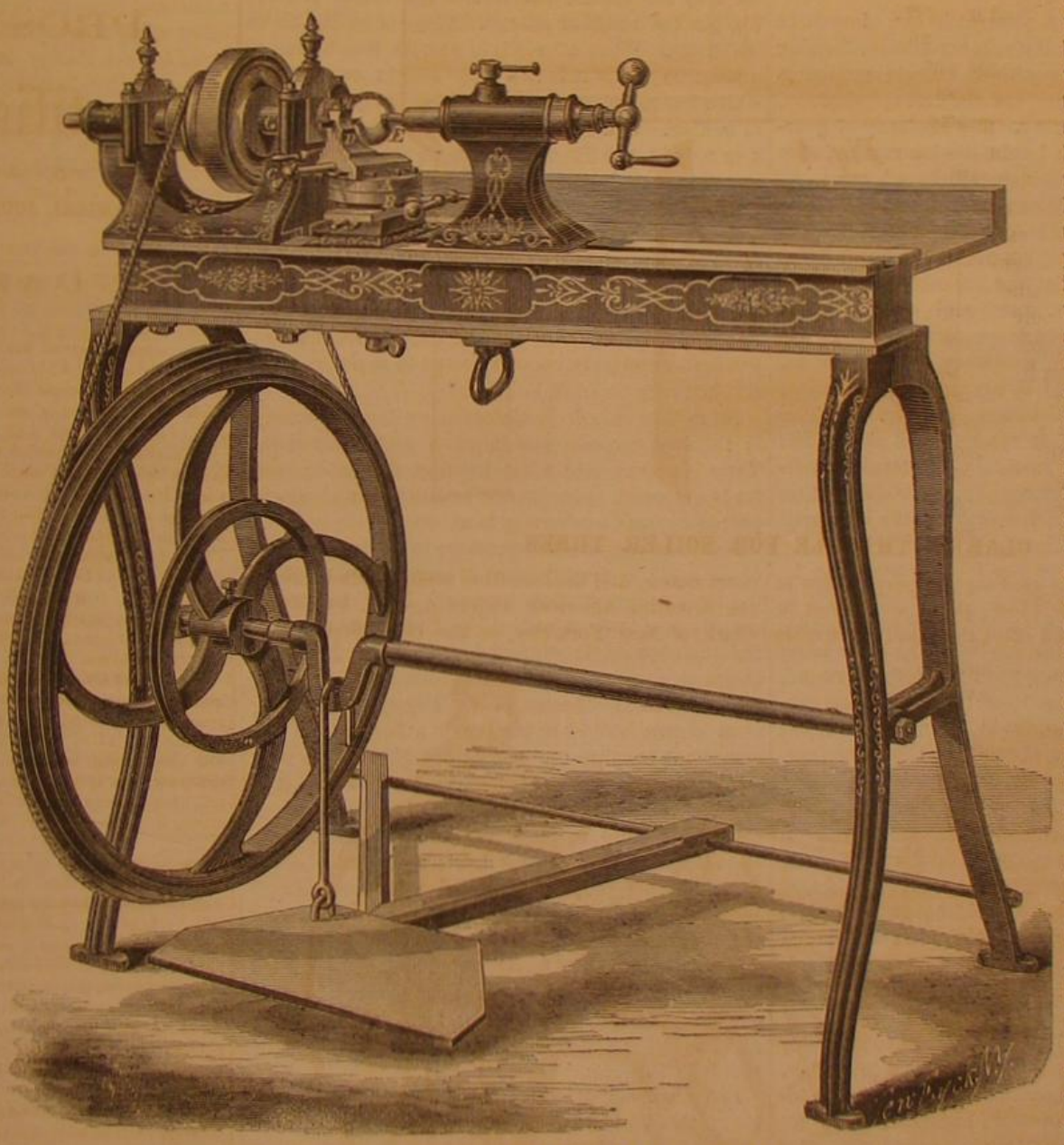
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Lathe for Turning Billiard Balls.

Much difficulty has always been experienced in turning spheres or globes, so that they will be perfectly round. Makers of philosophical apparatus have much to contend with in this respect, but turners of billiard balls, in particular, have felt the want of a machine which would turn out a perfect ball, for the skill and experience of the most celebrated player is frustrated by an untried ball, and many games have been lost by reason of the imperfection alluded to. So well is this fact known that a set of balls which are perfectly tried are greatly prized by those who aspire to become more than ordinary players of this fascinating game.

The lathe which is here illustrated has a rest of peculiar construction.—Very many machines have been devised to turn true balls, but most of them have been made on wrong principles, or else so complex that they practically defeated the object in view. The slide rest here illustrated is extremely simple and free from the objection above noted. It is constructed to be operated by hand, and the lathes are driven by steam or the foot, as desired. The peculiarity consists in attaching the upper part, A, of the compound slide rest, to the lower part, B, so that while it has a free movement round its center it has no lateral play, no tendency to jar, and no liability to spring and allow the tool to dig in, or the work to become full of "chatters." By merely grasping the handle, C, the tool stock, D, is carried round the ball in the chuck, so that it is accurately and truly turned to a perfect circle in a short space of time. The chucks which hold the ball itself are also peculiar. If an ordinary center were employed the ball would be injured, and in fact rendered useless for its office. A revolving stud, E, is therefore inserted in the spindle, F, fitted so as to turn easily and fit closely. This center is tipped with india-rubber, slightly cupped out so that it has a fair bearing on the ball; when the latter is turned by the chuck, the stud revolves in its spindle and the ball is steadied but not outwardly bruised. The end of the main driving spindle, G, is also made concave so that no wooden chucks are needed; but if they may be required for balls of unusual size, a thread is provided on the spindle, whereby chucks can be affixed as usual.

For manufacturers of all classes, who have work of this kind to execute either in metal or any other substance, for purposes of ornament or utility, this rest will be found a great advantage. It is now used by Messrs. Phelan and Collender in their large manufactory of billiard tables, and they state that they were unable to make a set of balls true before, except at a great expense of time and trouble, whereas, by the use of this rest, they have no difficulty whatever, and every set is guaranteed to be perfectly round. It was patented through the Scientific American Patent Agency on the 8th of September, 1863, by L. A. Johnson; for further information address Messrs. Phelan & Collender, 63 Crosby street, New York, where the lathe may be seen in operation.



LATHE FOR TURNING BILLIARD BALLS.

A Rotary Oil Car.

Recently, says the Philadelphia *Press*, a rotary oil car for the carriage of coal oil brought its first load of petroleum to this city via the Pennsylvania Railroad. This car has been patented by Mr. Lawrence Myers, of this city, and seems to be well adapted to the purpose for which it is intended. Its appearance can probably be understood by imagining two pairs of solid iron wheels, of sixty inches diameter each, connected together by hollow axles of fifty inches diameter, and the whole surmounted by a wooden platform. The oil is let into the hollow axles by means of a hose, and when filled the barrels are closed by valves arranged for the purpose. The expense of barrels and the cost of labor in their shipment is saved by this means. The car we saw has a capacity of 1,000 gallons, or 500 gallons in each cylinder. It is intended to make the cylinders of sixty inches diameter, which will carry 1,400 gallons of oil. In addition to this, the platform may be used for the carriage of other goods.

Ammoniacal Gas as a Motor.

The *Journal of the Society of Arts* states that M. Ch. Tellier has conceived a new and curious application of this gas. He proposes to take advantage of its peculiar properties and use it, in certain cases, as a substitute for steam. The qualities referred to are, its great solubility in water, its easy liquefaction, its power of supplying motive power at the ordinary atmospheric temperature, the capability of its vapor being superheated without too great an increase of the temperature, the possibility of re-collecting it by solution, and the faculty of extracting the latent heat from its vapor, after the latter has been employed, and transmitting it to that which is about to be used, by the simple act of dissolving the gas in water. With a given quantity of ammoniacal gas and three times its weight of water, says the inventor, the whole of the former may be vaporized and used as a motive force with a pressure of eight to ten atmospheres, and the action would be constant because the latent heat required for the vaporization would be constantly reproduced by the caloric released by condensation. So that liquid ammonia is said to supply an instantaneous and practical means of obtaining a motive vapor. With about 22 lbs. of the liquid, we are told, the force of one horse may be obtained for an hour. The inventor does not pretend to place this system in competition with the steam engine, but only where the production of steam would be impracticable and inconvenient. For instance, he says, "an omnibus, drawn by two ammoniacal horses, only need carry about 40 lb. of liquid ammonia and 120 lbs. weight of water. This would supply a simple motor, without smoke or steam, instantaneous in its action, however long and frequent were the stoppages, and with an economy over horses of at least 75 per cent." M. Tellier also recommends his invention for steep inclines on railways, tunnels, mines, and other places where heat cannot be tolerated. We believe that the idea dates back more than twenty years.

It required no less than twenty-seven ships to transport the cotton Sherman captured in Savannah.

REMARKS ON THE SUBJECT OF FORCE IN GENERAL.

BY JOHN A. ROEBLING.

[For the Scientific American.]

[Continued from page 128.]

Reduced to last principles, all difference between mechanical, dynamical and living forces or motions disappears. In every case motion is communicated. No motion is created or conjured up by any process whatever. Wherever energy is manifested it is caused by a disturbance of equilibrium, and this disturbance is caused by other disturbance, and so on to infinity. In other terms, the process of nature is a constant play of energies and movements communicated from one to the other.

Matter as the simple ponderable substance serves only as a vehicle of motion or energy. Energy in itself is simply the power to move a result of the principle of life. The different phenomena, therefore, which attend the display of the various energies of nature's life must be owing to the *scientific spirit* which directs these various movements. All motions are subject to mathematical laws, and consequently the science of mathematics, comprehended in its largest sense, can only supply the key which will unlock these mysterious movements. Human reason cannot be mistaken in this, because *itself* and mathematics are identical.

Luminar motion is a straight-linear, impulsive vibrating motion. It is the primary motion, forming the basis of all other motions. Caloric motion is centroperipheric, involving circular and spiral action, expanding and contracting. The tendency of gravity is towards the center, but its motion results in the ellipse. Magnetic motions, it is believed, are parabolic, and electricity is governed by the hyperbola.

As said before, motion is only communicated. The action of a waterfall may produce a thousand different results by communicating its motion. Wind is raised, vapor ascends, heat and electricity are evolved. By the gravity of the water wheels are turned and all kinds of machinery set in motion. Mechanical action again is converted into friction, heat, electricity and magnetism, etc., etc. Nothing is lost, neither is any thing created. All phenomena are but changes and conversions of the forms of matter, interwoven and interlocked to such a degree that only an infinite mind can comprehend the wonderful action and harmony of the whole.

The finest emotions of the human soul may be called up by mechanical action. A performer sits at the piano and expresses his musical ideas by mechanical action through the instrument. The latter being constructed in accordance with the laws of sound, musical harmony results from this mechanical performance, and it reverberates in the organism of the inner man through the channel of the outer ear. Here is a profound mystery, incomprehensible to a finite understanding. Musical ideas are converted into sound by mechanical action, and vice versa. If no relation existed between mind and matter could such phenomena take place? The truth is plain that all physical energies involve a spiritual principle, and that all mental phenomena involve material action.

There is no such thing as dead matter, neither is there an immaterial spirit. All energies result from spiritual action, outwardly manifested. Spirit and matter are as *cause* and *effect;* they are indissolubly connected, the one cannot exist without the other. Existence is life in degree, comparative life, and involves both, spirit and matter, the positive and the negative; their *polar* relations as *cause* and *effect* produce all energies and all phenomena of nature.

Motion is a translation of space into time and of time into space. Motion is an interweaving of space and time, but is antithetical to both. The principle of motion precedes the reality of space and time. The latter become actual relations through the reality of motion. Motion is the result of a process, and this process again involves motion. Notwithstanding the apparent circular logic of this statement, it is a deep truth, but its further elucidation would be out of place here, as it would lead to a purely metaphysical discussion. The reader is referred to a well digested essay on the origin of motion to Stallo's "Philosophy of Nature."

I will only add here, that the formation of natural matter, or of concrete points, out of the abstract center, is identical with the production of motion itself, and also with the appearance of space and time. Motion, space and time, and matter, form a trinity in unity; they hail from the same spiritual source, and are born out of the same womb, and by one and the same act.

Motion or energy is a primary function of life. The principle of life is uncreated, and so is energy or motion. We can make no distinction between energy and motion, they mutually state each other. Motion or energy being given as the cause, outer matter results as the effect, yet the two state themselves simultaneously. It is a useless task to account for motion or energy on purely material grounds; as much so, as a material explanation of life will always leave the question unanswered. The human mind must accept life as an uncreated principle, as the final cause of existence: natural reason, therefore, can only comprehend its natural relations, but no more. The self evident truth of a final cause, however, must form the basis of every sound philosophy.

The energies of forces are as the square of velocity, and the simple mass. The mass is constant, the velocity may vary, as it is the result of inner energy, or communicated. The so called force of *inertia* is no force at all. *Inertia* is pure passiveness, whether at rest or in motion. Whatever the motion of matter may be, this motion is not the result of *inertia*, but the result of energy. There is no inertia to overcome. When a body is at rest its weight exerts a pressure. Now it is this very weight or pressure which has to be overcome before the body can be set in motion. Gravity has grown out of inertness, but acts only in one direction, towards the center, while inertness acts in no direction because it is simple passiveness. In raising a body vertically its gravity alone results and this is exactly equal to its weight; there is no inertia to overcome. Also when a body is suspended like a pendulum to a string, infinitely long and without any stiffness, in moving that body no inertia results. But motion cannot without conversion be suddenly communicated in *mass* or *quantity*, but only by small increments.

No motion can be maintained by inertia; energy is required because resistance is met everywhere. There is no vacuum; a nothing does not exist; matter is universal, consequently resistance; and wherever is motion there energy is at work.

Matter at rest exerts a pressure towards the center of the earth in consequence of gravitation. This is the force of gravitation arrested. Now the initial velocity of a body at rest will be 1 in the first unit of time, as soon as its support is removed. Pressure, therefore, may be considered a momentum, resulting from an initial velocity of 1. Pressure resulting from simple weight or tension, is a force whose momentum is equal to the weight or tension. To start a railroad train requires more force than to keep it in motion. On a perfect level and with perfect machinery, however, no more power will be consumed to start the train with an initial velocity than is needed to maintain this speed, provided this speed is *infinitely* small. By any increase of speed a portion of the necessary force, in place of communicating motion to the train, will be converted and not rendered useful. The resistance being as the square of speed, a much greater expenditure of force is needed for rapid starting and this great expenditure is usually charged to *inertia*, but erroneously.

Inertness, massiveness and ponderability are all identical. The momentum of a moving body, once acquired, will continue, until it is diminished, either gradually or brought to rest suddenly, by resistance. This momentum being the result of two factors, that is, motion and massiveness, it is plain that without massiveness, there can be no momentum, no force, no motion. This is equally true in a mechanical as well as in a dynamical sense.

Chemical action results from the presence and contact of opposites. In the measure of forces two values have to be distinguished, *volume* and *intensity*. The direct agency in chemical action appears to be electricity. Now in electric tension there are *volume* and *intensity*, corresponding to volume and intensity in the phenomena of sound. Tension is energy, either asserted or moving. The higher the tension of a musical string the greater will be the number of vibrations per second, and the more intense and higher will be the sound. But the volume of motion, its massiveness, depends upon the quantity of matter moved. The volume of force, whether in sound or chemical action, would appear to be in the simple ratio of the mass of matter moved. In chemical action, therefore, this ratio should correspond to the atomic or equivalent number, because this represents the relation of weight or massiveness. *In sound it* is the mass of the sounding body. On the other hand the intensity of action in either case depends upon tension or rate of motion.

[To be Continued.]

The new English Steampship "City of Boston."

The Inman new screw steamship *City of Boston* will form a valuable addition to the numerous and handsome fleet of vessels belonging to the Liverpool, New York and Philadelphia Steamship Company. For strength, speed and beauty, probably the *City of Boston* cannot be excelled, although she may be equaled. The *City of Boston* is 305 feet in length, 39 feet in breadth, 27 feet 6 inches in depth, and 2,278 tuns, old measurement. The hull is built in six water-tight compartments, each bulkhead running from the keel to the spar deck, and, in effect, guaranteeing the greatest possible security to life should any accident occur at sea such as, under ordinary circumstances, would be likely to cause a ship to sink. To give additional strength the deck is from one end to the other made of iron plates of the best quality manufactured by the Mersey Steel and Iron Company, and upon the plates is laid the ordinary timber deck. The propelling power is supplied by a pair of direct acting trunk engines, of 350 horse power, nominal, the cylinders being 36 inches in diameter, having a three-feet stroke. The boilers are fitted with surface condensers and fired by wings. The screw has a pitch of 24 feet.

To Catch Birds of Prey.

A correspondent of the *Irish Agricultural Review* sends the following ingenious plan for catching predatory birds :—

"Take an egg-shell, stuff it with yellow clay, and stick it on the top of a sharp-pointed stick. Put the stick standing upright in a pool or shallow stream of water. Now place a stone in the water, with only a small portion of it appearing over the surface, and on that place a good rat-trap, in such a position that the bird, to get at the egg, shall have no other place to stand on but the trap. Shake a few dead leaves on the trap, and he will soon have a magpie, if there are many about. Of course, he will turn the unbroken part of the egg-shell up. The clay is only put in to afford a hold for the stick. The success of this method depends very much on changing the trap occasionally, watching it closely, and taking away the birds as they are caught. Magpies are very knowing, and will soon learn what it is, and avoid it. I have killed numbers in this way; both gray-backed crows and magpies."

J. F. Winslow and the Bessemer Process.

Mr. Holley thus dedicates his work on "Ordnance and Armor":—

"JOHN F. WINSLOW, ESQ.—*My Dear Sir* :- The inscription of your name in this work on Ordnance and Armor, is not only gratifying to me on personal grounds, and appropriate from a civilian student in the Art of War, to a civilian ever foremost in improving and developing the *materiel* of war; but it is an expression of that respect, shared by my countrymen at large, for the liberality and enterprise to which, together with the efforts of your associates, we are indebted for the *timely Monitor*, the first home-made steel ordnance, and the introduction of the Bessemer process. I am, dear sir, very respectfully your friend,

"A. L. HOLLEY.

"New York, Sept. 21, 1864."

A MAN came to the Duke of Wellington with a patented article. 'What have you to offer?' 'A bullet-proof jacket, your grace.' 'Put it on.' The inventor obeyed. The Duke rang a bell. An aid-de-camp presented himself. 'Tell the captain of the guard to order one of his men to load with ball cartridge.' The inventor disappeared, and was never seen again near the Horse Guards. No money wasted in trying that invention.

WROUGHT-IRON GUNS.

Of the three materials which have been used for the construction of heavy ordnance, cast iron, wrought iron, and steel, the one that has proved the least satisfactory is wrought iron. Guns not larger than 68 pounders may be made successfully of wrought iron, as they may of cast iron and other materials, but of all solid wrought iron guns larger than the 68 pounder, but one has exhibited an endurance equal to that of cast iron guns of the same size, while nearly all have burst after a very few rounds. From Holley's work on "Ordnance and Armor," we gather the following particulars in relation to all solid wrought iron guns larger than 68 pounders that have ever been made. It will be observed that the endurance of the 13-inch Horsfall gun, which is considered so extraordinary, is less than that of the 13-inch cast iron gun that was illustrated on page 324, Vol. IX., SCIENTIFIC AMERICAN.

"The most remarkable piece of this manufacture is the 'Horsfall Gun,' fabricated in 1858, and recently made famous in target practice at Shoeburyness.

"This gun is a solid forging of wrought iron, bored out. The trunnions are forged upon a separate ring, which is held in place by a key. The weight is 53,846 lbs., 2·21 oz.; the gun is not rifled.

"Above 8,000 lbs. of powder, and 60,000 lbs. of 282 lb. solid shot have been fired from this gun at various rounds; among others, there have been 90 rounds with 50 lbs. of powder, 21 rounds with 40 lbs., and 6 rounds with 50 lbs., at Shoeburyness; 2 rounds with 80 lbs., at Liverpool; 13 rounds with 20 to 45 lbs., and 50 rounds with 30 lbs. With 45 lbs. of powder, a number of shells were fired loaded with lead to weigh 310 and 318 lbs."

The gun was then examined and seven cracks were discovered in the bore, varying from $\frac{1}{10}$ of an inch to $13\frac{3}{4}$ inches in depth.

"After the gun had endured these tests, and had been presented to the British Government by the makers, it was left unprotected on the beach of Portsmouth. By renewed exertions, the Merser Company at last obtained permission to fire it at the Warrior target. It was found nearly buried with shingle and much injured by rust. Having been taken to Shoeburyness, it fired several rounds of 282 lb. shot with 74 lbs. of powder, with terrific effect at short range. The cost of such guns in England, would be about $12,500.

"The Prince Alfred gun, shown in the great Exhibition of 1862, was forged hollow, on a plan patented by Lt.-Col. Clay, of the Mersey Iron Works, and intended principally to overcome the defect of unequal shrinkage and initial strain and rupture. Broad plates, bent to the proper curve, were laid and welded upon a barrel made of rolled staves."

It has a caliber of 10 inches, and weighs 24,094 lbs.

"This gun has been fired but twice, and then as a smooth-bore; first, with a 140 lb. shot and 20 lbs. of powder, and, second, with the same shot and 30 lbs. of powder."

"The 12-inch wrought iron gun, in the Brooklyn Navy Yard, was forged like the Horsfall gun, by the Mersey Iron Works, in 1845, to replace the Stockton gun. Its dimensions are:—total length, 14 feet 1 in.; diameter over the chamber, 28 in.; length of bore, 12 feet; diameter of bore, 12 in.; weight, 16,700 lbs. It was received after the bursting of the Stockton gun, of which it is a copy, in shape, and has never been mounted for service. It has been fired once with two 224 lb. shot and 45 lbs. of powder."

"The British Government has ordered several guns of $6\frac{1}{2}$ inches bore, to be forged hollow, like the Alfred gun. One of these, weighing 7,282 lbs., was fired 10 rounds with 68 lb. 10 oz. shot; 10 rounds with 136 lb. 8 oz. shot; 10 with a 204 lb. shot; 10 with a 273 lb. shot; 10 with 340 lb. 8 oz. shot; 10 with 410 lb. shot; and 10 with a 476 lb. shot. At the 70th round the gun burst into eight pieces. Subsequent experiments on the metal gave a tensile strength of 45,359 lbs. per sq. inch."

Three 12-inch wrought iron guns were made some years since, under the direction of Commodore Stockton, for the U. S. Government.

"The first, called the 'Oregon', gun, was forged in England. After considerable use with charges of 20 to 30 lbs. of powder and 216-lb balls, it cracked through the reinforce, but was hooped and fired afterwards without injury. This gun is now in the Navy Yard at Philadelphia.

"The 'Peacemaker' was forged in the United States, by Messrs. Ward & Co."

The gun burst on board the United States steamer *Princeton*, after a few discharges, killing several members of President Tyler's cabinet. The failure of these large wrought iron guns is doubtless the result of imperfect welding of the several bars of which they were formed. It is claimed that this difficulty can be overcome by the Ames process of constructing cannon, which consists in welding successive coils together so as to build up the gun lengthwise. We published in our last volume two accounts of trial of one of these guns, but in neither were the particulars of the caliber and weight of the piece given. It was, however, stated that the gun was fired 700 rounds, with shot and shell ranging from 104 to 151½ lbs. in weight, and with various charges of powder, reaching as high as 30 pounds. If these statements are correct, the Ames gun has exhibited an endurance far beyond that of any other wrought iron gun yet constructed by the plan of solid forging; and if guns can be made uniformly of this strength, wrought iron will enter into competition with steel as the material for heavy ordnance. We should suppose, however, that the great difficulty of handling, forging and welding these enormous masses of iron would make wrought iron guns more costly than those of steel, which can be cast in the proper form, while the steel guns would be somewhat superior in strength and durability.

BOOKS AND PUBLICATIONS.

BURGH'S LAND AND MARINE ENGINES AND BOILERS.—The proportions of the several parts of engines and boilers is a matter of much importance, and we are frequently in receipt of letters asking advice on this subject. The work in question contains many rules for finding the sizes of different parts by ordinary arithmetical calculations, and cannot fail to be useful to mechanics and constructors of steam machinery. Rules are also given for obtaining the radius of the link used in link motion, for determining the position of the eccentric with relation to the crank, the size of the feed pump, steam ports, and, in short, every detail of any importance that is necessary has received attention.

Mr. N. P. Burgh, the author, has been concise with his rules but diffuse in his observations on steam engines. He says:—"The London engineers are undoubtedly the *ne plus ultra*, in every sense of the word, relative to marine engines." And again on page 31:—"The rules given for the feed pump are generally both abstruse and obtuse, thus confounding the uninitiated with perplexing calculations having no reference to the cause of requirement." What is an obtuse rule?

Henry Carey Baird, No. 406 Walnut street, Philadelphia, Pa., is the publisher of this work, and it can be had free by mail by addressing him at that place.

WOODWARD'S COUNTRY HOMES.—This is a book of 166 pages, and contains a large number of very chaste and beautiful designs for snug, comfortable homes. We have the neat laborer's cottage, the gardener's cottage, the farm cottage, design for a rural church, design for ice-house, school-house, carriage-house and stable, old house remodeled, chapter on gates, together with several designs for the more expensive class of suburban residences. The chapter on what is termed balloon framing with the clear diagrams is worth alone to country builders the whole cost of the book, which we understand to be $1 50, sent by mail.

The work is published by Messrs. Geo. E. & F. W. Woodward, No. 37 Park row, office adjoining our own.

We have long known these gentlemen as architects, and we regard them as among the most reliable and skillful men in the profession. Their new work on Country Homes ought to be in the hands of every man that builds or contemplates building a home.

TRANSACTIONS OF THE AMERICAN INSTITUTE FOR 1863.—The three societies of the American Institute—the Horticultural, Farmers' Club, and the Polytechnic Association—are the means of disseminating a great deal of useful information on various subjects.

These meetings are held in room No. 24 of the Cooper Union—the Polytechnic every Thursday evening throughout the year, when chemistry applied to the arts and sciences, petroleum, mechanics, machines, steam and hydraulic engines, and all that relates to American industry generally are discussed at greater or less length.

The proceedings are stenographically reported, and are afterward recorded in the minutes of the Institute, being finally published in book form.

The volume for 1863 is before us, and is interesting to mechanics and others by reason of the excellent reports and superb engravings which it contains. The Wheeler & Wilson button-hole machine, the Elliptic machine, and Root's steam engine are illustrated and fully described, while matters relating to the farmer's interest are also to be found.

This work can be obtained by addressing J. W. Chambers, Secretary of the American Institute.

How thin Steel can be Rolled.

Several interesting communications on the subject of thin rolled iron having been published, the Birmingham *Post* gives an account of an experiment in rolling steel. It seems to us that in this case the experiment was continued beyond the limits of endurance, for the texture was destroyed in the operation.

"To the lively competition in iron rolling, excited by the receipt of an iron letter from Pennsylvania, we have now to add an interesting note on the degree of thinness to which steel can be rolled. The samples we have seen were rolled at Mr. Gillott's works, and have been sent to Messrs. Holtzapffell and Co, to be measured by their micrometer gage. Messrs. Holtzapffel and Co. say:—'We have carefully measured three sheets of steel, and find the average thickness to be one eighteen-hundredth part of the English standard inch. The thinnest tissue paper we have been able to purchase at the stationers' shops measures one twelve-hundredth part of an inch; those samples of cast rolled steel show very fine holes and have a porous surface, but still are perfectly smooth and easy to write on, and the porosity can only be seen when they are held up to a good light. It is believed that steel may be rolled still finer when other experiments are made.'"

What is an Inch of Rain?

The late weekly return of the British Registrar-General gives the following interesting information in respect to rain fall:—"Rain fell in London to the amount of 0·43 inches, which is equivalent to forty-three tuns of rain per acre. The rain fall during last week varied from thirty tuns per acre in Edinburgh, to two hundred and fifteen tuns per acre in Glasgow. An English acre consists of 6,272,640 square inches; and an inch deep of rain on an acre yields 6,272,640 cubic inches of water, which at 277,274 cubic inches to the gallon, makes 22,622·5 gallons; and, as a gallon of distilled water weighs ten pounds, the rainfall on an acre is 226,225 pounds avoirdupois; but 2,240 pounds are a tun, and consequently an inch deep of rain weighs 100·993 tuns, or nearly one hundred and one tuns per acre. For every one hundredth of an inch a tun of water falls per acre." If any agriculturist were to try the experiment of distributing artificially that which nature so bountifully supplies, he would soon feel inclined to "rest and be thankful."

A PIECE OF IMPERTINENCE.—A letter has just been received at the Navy Department from Sir William Armstrong, the well known English gunmaker, in which he urges this Government to imitate the example of France and Russia, by manufacturing his guns. To this piece of scientific impertinence, Capt. Wise of the Ordnance Bureau has written a caustic reply, in which he tells Sir William that the Armstrong guns captured at Fort Fisher afford us the means of testing their supposed efficiency. Upon these guns was found an inscription, setting forth that they were a present from Sir William Armstrong to Jeff Davis.

ENGLISH jewellers are now setting small Brazilian beetles of green and gold color, which are found in immense numbers at Bahia, in gold and silver to form bracelets, brooches, etc.

REPORT OF THE COMMITTEE OF THE FRANKLIN INSTITUTE ON SCREW THREADS.

The Special Committee on a Uniform System of Screw Threads, Etc., presented the following report:—

That in the course of their investigations they have become more deeply impressed with the necessity of some acknowledged standard, the varieties of threads in use being much greater than they had supposed possible; in fact the difficulty of obtaining the exact pitch of a thread not a multiple or sub-multiple of the inch measure is sometimes a matter of extreme embarrassment.

Such a state of things must evidently be prejudicial to the best interests of the whole country, a great and unnecessary waste is its certain consequence, for, not only must the various parts of new machinery be adjusted to each other in place of being interchangeable, but no adequate provision can be made for repairs, and a costly variety of screwing apparatus becomes a necessity. It may reasonably be hoped that should a uniformity of practice result from the efforts and investigations now undertaken, the advantages flowing from it will be so manifest as to induce reform in other particulars of scarcely less importance.

Your Committee have held numerous meetings for the purpose of considering the various conditions required in any system which they could recommend for adoption. Strength, durability, with reference to wear from constant use and ease of construction, would seem to be the principal requisites in any general system, for, although in many cases, as, for instance, when a square thread is used, the strength of the thread or bolt are both sacrificed for the sake of securing some other advantage, yet all such have been considered as special cases, not affecting the general inquiry. With this in view, your Committee decided that threads having their sides at an angle to each other must necessarily more nearly fulfil the first condition than any other form; but what this angle should be must be governed by a variety of considerations, for it is clear that if the two sides start from the same point at the top, the greater the angle contained between them the greater will be the strength of the bolt; on the other hand, the greater this angle, supposing the apex of the thread to be over the center of its base, the greater will be the tendency to burst the nut, and the greater the friction between the nut and the bolt, so that if carried to excess the bolt would be broken by torsional strain rather than by a strain in the direction of its length. If, however, we should make one side of the thread perpendicular to the axis of the bolt, and the other at an angle to the first, we should obtain the greatest amount of strength, together with the least frictional resistance; but we should have a thread only suitable for supporting strains in one direction, and constant care would be requisite to cut the thread in the nut in the proper direction to correspond with the bolt; we have consequently classed this form as exceptional, and decided that the two sides should be set at an angle to each other and form equal angles with the base.

The general form of the thread having been determined upon the above considerations, the angles which the sides should bear to each other has been fixed at 60°, not only because this seems to fulfil the conditions of least frictional resistance, combined with the greatest strength, but because it is an angle more readily obtained than any other, and it is also in more general use. As this form is in common use almost to the exclusion of any other, your Committee have carefully weighed its advantages and disadvantages before deciding to recommend any modification of it. It cannot be doubted that the soft thread offers us the simplest form, and that its general adoption would require no special tools for its construction, but its liability to accident, always great, becomes a serious matter upon large bolts, while the small amount of strength at the sharp top is a strong inducement to sacrifice some of it for the sake of better protection to the remainder; when this conclusion is reached, it is at once evident a corresponding space may be filled up in the bottom of the thread, and thus give an increased strength to the bolt, which may compensate for the reduction in strength and wearing surface upon the thread. It is also clear that such a modification, by avoiding the fine points and angles in the tools of construction, will increase their durability; all of which being admitted, the question comes up what form shall be given to the top and bottom of the thread? for it is evident one should be the converse of the other. It being admitted that the sharp thread can be made interchangeable more readily than any other, it is clear that this advantage would not be impaired if we should stop cutting out the space before we had made the thread full or sharp, but to give the same shape at the bottom of the thread would require that a similar quantity should be taken off the point of the cutting tool, thus necessitating the use of some instrument capable of measuring the required amount, but when this is done the thread having a flat top and bottom can be quite as readily formed as if it was sharp. A very slight examination sufficed to satisfy us that in point of construction, the rounded top and bottom presents much greater difficulties, in fact all taps and screws that are chased or cut in a lathe required to be finished or rounded by a second process. As the radius of the curve to form this must vary for every thread, it will be impossible to make one gage to answer for all sizes and very difficult, in fact impossible, without special tools to shape it correctly for one.

Your Committee are of opinion that the introduction of a uniform system would be greatly facilitated by the adoption of such a form of thread as would enable any intelligent mechanic to construct it without any special tools, or if any are necessary, that they shall be as few and as simple as possible, so that although the round top and bottom presents some advantages when it is perfectly made, as increased strength to the thread and the best form to the cutting tools, yet we have considered that these are more than compensated by ease of construction, the certainty of fit and increased wearing surface offered by the flat top and bottom, and therefore recommend its adoption. The amount of flat to be taken off should be as small as possible, and only sufficient to protect the thread; for this purpose one-eighth of the pitch would seem to be ample, and this will leave three-fourths of the pitch for bearing surface. The considerations governing the pitch are so various that their discussion has consumed much time.

As in every instance the threads now in use are stronger than their bolts, it became a question whether a finer scale would not be an advantage, it is possible that if the use of the screw thread was confined to wrought iron or brass, such a conclusion might have been reached, but as cast iron enters so largely into all engineering work, it was believed finer threads than those in general use might not be found an improvement, particularly when it was considered that so far as the vertical hight of thread and strength of bolt are concerned, the adoption of a flat top and bottom thread was equivalent to decreasing the pitch of a sharp thread 25 per cent, or, what is the same thing, increasing the number of threads per inch 33 per cent. If finer threads were adopted they would require also greater exactitude than at present exists in the machinery of construction, to avoid the liability of overriding, and the wearing surface would be diminished; moreover, we are of opinion that the average practice of the mechanical world would probably be found better adapted to the general want than any proportions founded upon theory alone.

We have taken some pains to ascertain what the proportions in use are, and submit the following, as being in our judgment a fair average, viz:—

Diam. of Bolt...	¼	5-16	⅜	7-16	½	9-16	⅝	¾	⅞	1	1⅛	1¼
Threads per in...	20	18	16	14	13	12	11	10	9	8	7	7
Diam. of Bolt...	1⅜	1½	1⅝	1¾	1⅞	2	2¼	2½	2¾	3	3¼	3½
Threads per in...	6	6	5½	5	5	4½	4½	4	4	3½	3½	3¼
Diam. of Bolt...	3¾	4	4¼	4½	4¾	5	5¼	5½	5¾	6	...	...
Threads per in...	3	3	2⅞	2¾	2⅝	2½	2½	2½	2½	2¼	...	...

The proportions for bolt-heads and nuts, as given in most of our books of reference, are believed to be larger than necessary, and all are tabulated, necessitating constant reference, a simple formula would probably induce a uniform practice, but as most of the sizes in common use are made by machinery and also by hand, it is believed the bolt-head and nut for finished work should be made somewhat smaller than for rough, to avoid the confusion that would ensue if the necessary allowance for dressing should be made upon work intended for finishing.

In conclusion, therefore, your Committee offer the following:—

Resolved, That the Franklin Institute of the State of Pennsylvania recommend for general adoption by American Engineers, the following forms and proportions for screw threads, bolt-heads and nuts, viz.—

That screw threads shall be formed with straight sides at an angle to each other of 60°, having a flat surface at the top and bottom equal to one-eighth of the pitch. The pitch shall be as in the preceding table.

The distance between the parallel sides of a bolt-head and nut for a rough bolt shall be equal to one-and-a-half diameters of the bolt, plus one-eighth of an inch. The thickness of the heads for a rough bolt shall be equal to one-half the distance between its parallel sides. The thickness of the nut shall be equal to the diameter of the bolt. The thickness of the head for a finished bolt shall be equal to the thickness of the nut. The distance between the parallel sides of a bolt-head and nut, and the thickness of the nut shall be one-sixteenth of an inch less for finished work than for rough.

Resolved, That a copy of these resolutions be forwarded to the Quarter Master General, Chief of the Bureau of Steam Engineering of the Navy, and the Chief of the Bureau of Ordnance for the Army and Navy, and Chiefs of the Engineer and Military R.R. Corps, and the Supt. and M.M. of R.R. Co.'s, requesting them to use their influence to promote the adoption of a uniform system of screw threads, bolt-heads and nuts, by requiring all builders on new contracts to conform to the proportions recommended.

Resolved, That a copy of these resolutions be also sent to all Mechanical and Engineering Associations or Institutes, and the principal Machine and Engine Shops in the country, with a request that they will use their influence in the proposed system.

Resolved, That this Committee be now discharged.

WM. B. BEMENT, firm of Bement & Dougherty.
C. T. PARRY, supt. Baldwin's Locomotive Works.
J. VAUGHAN MERRICK, firm of Merrick & Sons.
JOHN A. TOWNE, firm of I. P. Morris, Towne & Co.
COLEMAN SELLERS, Engr. Wm. Sellers & Co.
B. H. BARTOL, supt. Southwark Foundery.
EDWARD LONGSTRETH, foreman Baldwin's Loc. Works.
JAMES MOORE, firm of Matthews & Moore.
WM. SELLERS, firm of Wm. Sellers & Co.
ALGERNON ROBERTS, of the Pencoyd Iron Works.

Letter from Mr. Mushet.

We find the following in the London *Engineer*:—

THE BESSEMER PROCESS.

SIR:—When Mr. Bessemer read his celebrated paper at the meeting of the British Association at Cheltenham, in 1856, I saw clearly where his difficulties would arise, and that he could not, by his process, produce either iron or steel of commercial value. A few days after the reading of the paper, I received specimens of Bessemer metal. Some of these were cold short and some were cold tough; but all were alike red short at any heat under the welding heat. They were ductile enough when worked at a high welding heat; but as soon as the temperature was lowered, the bars broke off or crumbled like heated cast iron. I at once saw that, by melting them again with manganesic pig iron, or spiegeleisen, they would form good steel or iron, according to the dose of manganesic pig added to them. Late that night it occurred to me that, by mixing the already melted Bessemer metal with melted spiegeleisen, the process could at once and simply be rendered successful.

I immediately lighted a fire in a small steel melting furnace, and placed in the furnace two crucibles, one containing eight ounces of Bessemer metal, and the other one ounce of spiegeleisen. When the contents of the crucibles were melted I withdrew the crucibles, and poured the melted spiegeleisen into the melted Bessemer metal; I then emptied the mixture into a small ingot mold; the ingot was piped, and had all the characteristics of an ingot of excellent cast steel. I next heated the ingot to a fair cast-steel heat. Mrs. Mushet held it in a pair of tongs, and I drew it out with a sledgehammer into a flat bar. I heated this bar, and then twisted it in a vise, at a white heat, red heat, and black red heat; and it remained perfectly clear and sound in the edges, without a trace of red shortness. I now doubled and welded the bar, and forged it into a chisel, which I tempered and tried severely for a flat chisel and diamond point, upon hard cast iron. The chisel stood the test well, and was, in fact, welding cast steel, worth, at the least, 42s. per cwt. I saw now that I had made a discovery even more valuable than that of the Bessemer process; for, although the Bessemer process was not of any value apart from my invention, on the other hand, my invention could be applied extensively in the manufacture of pot-melted steel. Less conversant with the world than with matters relating to iron and steel, I confided in certain parties of great wealth and influence in the iron trade, believing that I had to deal with men of honor and integrity, incapable of a mean and base action. On this score I gained experience, which cost me my patents, but taught me a lesson not easily forgotten. I placed my patents in the hands of parties who promised to carry them out, and see justice done to

me. I now proceeded to extend the scale of operations as follows:—

I charged sixteen melting pots with 44 lb. each of Bessemer metal, and when this was melted I poured into each pot 3 lb. of melted spiegeleisen. I then poured the contents of the sixteen melting pots into a large ingot mold, and the ingot thus made was sent to the Ebbw Vale Ironworks, and then rolled at one heat into a double-headed rail. This rail was sent to me for inspection, and to be by me forwarded to Mr. Ellis at Derby station, to be laid down there at a place where iron rails had to be changed once in three months.

When the rail, which was very perfect, came to me, it was so thickly studded with the words "Ebbw Vale Iron Co ," that no space remained to squeeze in the words "Robert Mushet."

I sent the rail to Derby, and I read a public statement made by Mr. Adams of the Ebbw Vale, some time ago, to the effect that this rail remained as perfect as ever, after six years wear and tear from the passage over it of 700 trains daily. That was the first Bessemer rail.

I next charged twenty melting pots with 46 lb. each of Bessemer metal, and when melted I poured into each pot 2 lb. of melted spiegeleisen, and then emptied the contents of all the melting pots into one ingot mold. The ingot was rolled at two heats, at Ebbw Vale Ironworks, into a bridge rail, which would have been about thirty feet long, but the engine was overpowered when the rail was in the last groove and stopped, so that the rail had to be cut in two. One piece, sixteen feet long, was exhibited in the office of an influential Iron Company in London, as the produce of the Uchatius or atomic process of steel making.

Let us charitably suppose that the gentlemen who exhibited this rail were at the time laboring under some mental hallucination. To enable me to specify my patent, I was very generously furnished by Mr. S. H. Blackwell of Dudley with a blowing machine capable of sustaining a pillar of blast of 10 lb. per square inch. With this blowing apparatus and some small furnaces operating upon from 60 lb. to 600 lb. melted cast iron, I experimented for six months, and satisfied myself that the whole affair was as simple, and, indeed, far more simple, than the ordinary foundery process for melting and casting iron. I made cast steel direct from the Bessemer, of a quality fairly valued at £56 per tun, but which apparently has not been accomplished subsequently by others who have adopted the process. I am well aware of the cause of the failure and of many difficulties that beset, and will still continue to beset, this process, until it is reduced to the simple first principles which govern it. I do not in the least grudge to Mr. Bessemer the £100,000 per annum which my invention is enabling him to realize. It was not by any fault of his that my patent was lost; but I wish, for his own sake, that he had manfully acknowledged the source of his success, and had been content with the amply sufficient merit of his own inventions and perseverance, without endeavoring tacitly to monopolize the credit due to me and to himself jointly. R. Mushet.

Cheltenham, Jan. 23, 1865.

COUNT RUMFORD.

Professor Youmans, in the introduction to his collection of treatises on the Correlation of Forces gives this sketch of Count Rumford:—

"Benjamin Thompson was born at Woburn, Mass., in 1753. He received the rudiments of a common school education, became a merchant's apprentice at twelve, and subsequently taught school. Having a strong taste for mechanical and chemical studies, he cultivated them assiduously during his leisure time. At seventeen he took charge of an academy in the village of Rumford, (now Concord), N. H., and in 1772 married a wealthy widow, by whom he had one daughter. At the outbreak of revolutionary hostilities he applied for a commission in the American service, was charged with toryism, left the country in disgust and went to England. His talents were there appreciated, and he took a responsible position under the government, which he held for some years.

"After receiving the honor of knighthood he left England and entered the service of the Elector of Bavaria. He settled in Munich in 1784, and was appointed aide-de-camp and chamberlain to the Prince. The labors which he now undertook were of the most extensive and laborious character, and could never have been accomplished but for the rigorous habits of order which he carried into all his pursuits. He reorganized the entire military establishment of Bavaria, introduced not only a simpler code of tactics, and a new system of order, discipline and economy among the troops and industrial schools for the soldiers' children, but greatly improved the construction and modes of manufacture of arms and ordnance. He suppressed the system of beggary which had grown into a recognized profession in Bavaria, and become an enormous public evil—one of the most remarkable social reforms on record. He also devoted himself to various ameliorations, such as improving the construction and arrangement of the dwellings of the working classes, providing for them a better education, organizing houses of industry, introducing superior breeds of horses and cattle, and promoting landscape gardening, which he did by converting an old abandoned hunting-ground near Munich into a park, where after his departure, the inhabitants erected a monument to his honor. For these services Sir Benjamin Thompson received many distinctions, and among others was made count of the holy Roman Empire. On receiving this dignity he chose a title in remembrance of the country of his nativity, and was thenceforth known as Count of Rumford.

"His health failing from excessive labor and what he considered the unfavorable climate, he came back to England in 1798, and had serious thoughts of returning to the United States. Having received from the American government the compliment of a formal invitation to revisit his native land, he wrote to an old friend requesting him to look out for a 'little quiet retreat' for himself and daughter in the vicinity of Boston. This intention, however, failed, as he shortly after became involved in the enterprise of founding the Royal Institution of England.

"There was in Rumford's character a happy combination of philanthropic impulses, executive power in carrying out great projects, and versatility of talent in physical research. His scientific investigations were largely guided and determined by his philanthropic plans and public duties. His interest in the more needy classes led him to the assiduous study of the physical wants of mankind, and the best methods of relieving them; the laws and domestic management of heat accordingly engaged a large share of his attention. He determined the amount of heat arising from the combustion of different kinds of fuel, by means of a calorimeter of his own invention. He reconstructed the fireplace, and so improved the methods of heating apartments and cooking food as to produce a saving in the precious element, varying from one-half to seven-eights of the fuel previously consumed. He improved the construction of stoves, cooking ranges, coal grates and chimneys; showed that the non-conducting power of cloth is due to the air enclosed among its fibers, and first pointed out that mode of action of heat called *convection;* indeed he was the first clearly to discriminate between the three modes of propagating heat—radiation, conduction and convection. He determined the almost perfect non-conducting properties of liquids, investigated the production of light, and invented a mode of measuring it. He was the first to apply steam generally to the warming of fluids and the culinary art; he experimented upon the use of gunpowder, the strength of materials, and the maximum density of water, and made many valuable and original observations upon an extensive range of subjects.

"Prof. James D. Forbes, in his able Dissertation on the recent Progress of the Mathematical and Physical Sciences, in the last edition of the 'Encyclopedia Britannica,' gives a full account of Rumford's contributions to science, and remarks:—

"'All Rumford's experiments were made with admirable precision, and recorded with elaborate fidelity, and in the plainest language. Every thing with him was reduced to weight and measure, and no pains were spared to attain the best results.

"'Rumford's name will ever be connected with the progress of science in England by two circumstances: first, by the foundation of a perpetual medal and prize in the gift of the council of the Royal Society of London, for the reward of discoveries connected with heat and light; and, secondly, by the establishment in 1800 of the Royal Institution in London, destined, primarily, for the promotion of original discovery, and, secondarily, for the diffusion of a taste for science among the educated classes. The plan was conceived with the sagacity which characterized Rumford, and its success has been greater than could have been anticipated. Davy was there brought into notice by Rumford himself, and furnished with the means of prosecuting his admirable experiments. He and Mr. Faraday have given to that institution its just celebrity with little intermission for half a century.'

"Leaving England, Rumford took up his residence in France, and the estimation in which he was held may be judged of by the fact that he was elected one of the eight foreign associates of the Academy of Sciences.

"Count Rumford bequeathed to Harvard University the funds for endowing its professorship of the Application of Science to the Art of Living, and instituted a prize to be awarded by the American Academy of Sciences, for the most important discoveries and improvements relating to heat and light. In 1804 he married the widow of the celebrated chemist Lavoisier, and with her retired to the villa of Auteuil, the residence of her former husband, where he died in 1814."

A New Electro-Magnet.

Is it possible that our present electro-magnet is to what it might be, what the cog wheel of the early railway engineers was to the present smooth one? For after our electricians have for so many years been exhausting their ingenuity to accomplish a certain object, M. Du Moncel—no mean authority in such matters—comes forward and declares that the object gained by that ingenuity is worse than useless. An electro-magnet may be briefly defined to be a cylinder of iron covered with a helix of wire; very powerless is the iron if no current is passing through the wire; very powerful is it—witness the Royal Institution magnet, and the one in Paris which is covered with 20,000 ft. of wire and lifts a weight of three tuns—while a current passes. We may say, therefore, that the power of the magnet depends on the wire; and it has always been considered necessary that the wire, thin or thick, according to the work to be done or the strength of the current used, must be most carefully covered with an insulated substance. So we have wires covered with silk, with cotton, india-rubber, and varnishes of different kinds. And this equally in the electro-magnets used for experiments as in those used for the ten thousand purposes in which electricity is now being daily employed; indeed, we may almost say that electricity works by electro-magnets. Some time ago, M. Carlier, an electrician in Paris, asked himself the question—Is this covering necessary? And he very properly set to work to make an electro-magnet with uncovered wire to answer the question. M. Du Moncel, in a communication to the Paris Academy, on the 9th inst., declares that the answer thus given is so extraordinary, and the power of the uncovered electro-magnet so great, that he can scarcely believe his own experiments. Not only can these new magnets produce all the effects of attraction of the covered ones, but the effects in some cases are more than doubled. Let us produce M. Du Moncel's figures. A bar of iron 4½ centimeters long, and 7 millimeters in diameter, covered with a single spiral of wire 0.277 millimeters in diameter, with two small Bunsen's elements, sustained a weight of 3·9 kilogrammes; covered, it could only support 2·4 kilogrammes. A larger magnet, covered with twelve coats of wire, held up 940 grammes; with covered wire it could only support 540 grammes. The effects of distant attraction were even more favorable. At a distance of one millimeter, and with a Daniell's pile of twenty-eight elements, the weights attracted were as follows:—

Circuit.	New Magnet.	Old Magnet.
0 kilometres	83	12
10 ,,	12	3
20 ,,	4	0

The requisite condition to obtain these effects is that the different "coats" of wire shall be separated from each other by a piece of paper, and that the interior of the bobbins, whether in wood or copper, should be

covered also with an isolated substance. The advantages of this system are obvious, the first being reduced cost of the magnets. Then we have greater effects, which is tantamount to a reduction of size—and consequently another reduction of the cost. The "extra currents" being also done away with, a more prompt movement of the armatures results, and therefore greater usefulness in induction coils. In telegraphic instruments they present the additional advantage of remaining unaffected by lightning. M. Du Moncel remarks, by way of explanation—explanation is easier than prediction—"I consider that in magnets of the new construction the surface of contact of the spirals between themselves represents, in fact, a linear spiral, of which the points furnish derivations. We can easily imagine that the electric flux provoked by these derivations can only be produced by furnishing a series of superposed currents circulating through all the folds of the metallic helix, by reason of the resistance to the passage from one spiral to the other. Now, if the primitive current circulating through the helix is weakened by these derivations, it is reinforced by the derived and superposed current, which, in over exciting the pile, furnishes at last a more energetic current. Besides it must be borne in mind that the direct current which results from the derivations, and which passes through the spirals towards the axis, ought to be derived from them, and as it is not enfeebled by its passage, it should augment the intensity of the current which flows through it." Lastly, the quantity of uncovered wire which can be used for a given magnet is greater than that of covered. We shall, doubtless, at once hear of some experiments disproving or supporting M. Du Moncel's; in the latter case the method he points out should be immediately acted upon.—*Reader.*

The Origin of the Locomotive.

In the matter of priority of invention in, or rather of attempts at, land propulsion by steam, the French may well claim to be our *devanciers*, and we do not think that any true Englishman will be inclined to grudge them this honor. The first steam carriage seems to have been made by a Frenchman, Cugnot, in 1760, that same marvellous year which witnessed the birth of Napoleon I., Wellington, Humboldt, Mehemet Ali, Lord Castlereagh, Sir E. I. Brunel, Cuvier, and the first patent of Arkwright, the first patent of Watt, as also some other events almost as great in their eventual influence on the present era. An engine made by Cugnot is still in existence in the Conservatoire des Arts et Metiers at Paris. It has a copper boiler, very much like a common kettle without the handle and spout, furnishing with steam a pair of 13-in. single-acting cylinders. The engine propels a single driving wheel, which is roughened on its periphery. Altogether, this engine bears considerable testimony to the mechanical genius of its inventor. It was unsuccessful, having got overturned once or twice on the very bad roads then existing in France, and it was put on one side. It is stated, however, that arrangements were made, in 1801, to put it to work in the presence of Napoleon Bonaparte. The departure, however, of Napoleon for Egypt, prevented the trial—a circumstance which recalls Fulton's subsequent unsuccessful negotiations with Napoleon for aid in attempting marine propulsion by steam. Watt, then, in 1784, patented a locomotive engine, the boiler of which was to be "of *wood*," hooped like a beer barrel. Watt, however, had not much faith in steam carriages, and he objected to the attempts made in this direction, in 1784, by William Murdoch, his very able assistant. The miniature engine made by Murdoch in that year is still carefully preserved at Soho. Careful and elaborate researches, such as those lately made by Mr. Zerah Colburn, into the history of the locomotive, seem to more and more confirm existing impressions as to the great part done by Trevethick in the introduction of the locomotive engine.—*Builder.*

Chloride of Barium against Boiler Incrustation.

The applicability of chloride of barium for removing and preventing boiler incrustations of sulphate of lime is not so well known as it should be. Recent experiments made in Hanover show that it may be used with advantage in many cases. Chloride of barium decomposes the sulphate of lime present in many waters, forming chloride of lime, which remains in solution, and sulphate of barium which precipitates in the form of powder, producing a yellowish white slush at the bottom of the boiler. The chloride of barium should always be present in excess in the boiler, which is the case when no further turbidity is produced on adding some to a sample of the water. The high specific gravity of the sulphate of barium, which is double that of any lime salt, requires the use of a shovel for removing the slush, but also prevents the possibility of any of the particles being carried up by the steam. When the boiler is stopped for cleansing purposes, the water should not be entirely drawn off until cold, the slush becoming otherwise dried and hardened by the heat. The water may also be purified previous to use, time being allowed for the settling down of the turbidity. Unlike certain other chemicals frequently employed, chloride of barium has not the least injurious effect upon iron.—*Engineer.*

Various Sources of Vegetable Oils.

A very large white pea is grown near Shanghae, in China from which oil is extracted for burning. So extensively is this article used that from Shanghae alone £2,000,000 worth is yearly distributed over China. This leguminous plant is called teuss. There is another Chinese production called the tea oil, said to be produced from the seeds of species of the two genera, thea and camellia, which oil is nearly unknown in Europe. When fresh it is quite free from smell, of a pale yellow tint, and devoid of sediment. It resists a cold of 40°, and its density is 927. It burns with a remarkably clear white flame. This oil might prove an important article of commerce in the East, because in its properties it is superior to cocoanut oil, and the various other oils used for burning. From the leaves of the Australian eucalypte on oil can be procured of equal utility to the cajeput oil of the East. Among the various kinds of oils used in Northern Germany, especially in the kingdom of Hanover, that extracted from the nuts of the beech is deserving of notice. Beech oil does not play a prominent part in commerce, nor is it likely to do so, owing to the fact that it cannot be obtained in large quantities. The country people who collect the nuts, or who cause them to be collected, use the greater part of the oil extracted from them in their household, and dispose only of the remaining fraction. About the beginning of November the nuts are gathered, either by picking up those which have fallen to the ground, or by spreading large sheets under the trees and beating the branches with poles, so as to cause the nuts to separate from them. Twenty-five pounds of nuts yield about five pounds of oil. The oil is of a pale yellow color, and has an extremely agreeable taste. It is often adulterated with walnut oil; the latter is even sold as beech oil, and this may account for the difference of opinion respecting the quality of beech oil. The townspeople use it chiefly as salad oil, but the peasantry employ it as a substitute for butter, etc., and only when there has been a good harvest for nuts, for burning in their lamps. The nuts are, after the oil has been expressed, made into cakes about nine inches square, and an inch and a-half thick: these are used for combustibles.—*Technologist.*

Rubidium.

According to the latest experiments of Prof. Bunsen in connection with the preparation and properties of this metal, it appears that it may be reduced from carbonated aciferous tartrite of oxide of rubidium(in a manner similar to the reduction of kalium): 75 grains of that salt will yield 5 grains of pure metal melted to a compact mass. It is very light, like silver, its color is white, with a yellowish *nuance*, hardly perceptible. In contact with air it covers itself immediately with a bluish gray coating of suboxyd, and is inflamed (even when in large lumps) after a few seconds, much quicker than kalium. At a temperature of 14° Fahr., it is still as soft as wax; it becomes liquid at 101-3° Fahr., and in red heat it is transformed in to a greenish-blue vapor. The specific gravity of rubidium is about 1·52. It is much more electro-positive than kalium, if combined with the latter to a galvanic chain, by acidiferous water. The rubidium, thrown on water, will burn and show a flame of the same appearance as that exhibited by kalium.

Correspondence

Pyroligneous Acid in Chimneys.

MESSRS. EDITORS:—In your last paper I noticed the article under the above heading, and believe I can suggest a remedy for the moisture in the chimney, which is as follows:—The pipe should not be less than six inches diameter, with round joints or elbows to give the smoke a natural curve around the corners, and where it enters the chimney the pipe should be enlarged and made oval, so that the widest way will be equal to the width of the flue, and the narrowest way equal to the thickness of the flue. The chimney is small, but will improve the draught, and be, I think, an effectual remedy, provided no other pipes enter the chimney near this one.

WM. O. GLOVER.

New Milford, Conn., Feb. 20, 1865.

Dental Plates.

MESSRS. EDITORS:—If your correspondent S. H. will use pure platinum for his plates, and have the teeth soldered fast with pure gold, he will have no further trouble with the galvanic action of which he justly complains. Or, he may have the teeth baked on to the platinum plate, by Allen's or Moffit's plan or process. This kind of work is better for under sets, but almost too heavy for upper. The best plate for upper sets, when properly got up, is the vulcanite or hard rubber.

Philadelphia. W. P. H., Dentist.

The English and the American Patent Offices.

Our English contemporaries have for some months been discussing the important subject of patents and laws relating thereto, some suggesting the need of reform, others advocating the entire abolishment of them, and similar views. In a late number of the *Westminster Review* can be found the following tribute to the system pursued in our Patent Office:—

The *Review* gives the decided perference to our patent system over that of Great Britain in two particulars. The first is the preliminary examination as to the novelty of an invention by the office previous to the issuing of the patent. This is obviously on the ground that the office can perform this work much better than the inventor, especially where, as in this country, according to the *Review*, the examiners "are men of exceptional talent."

He is thus saved the expense of taking out a patent which has been anticipated, or from the greater expense, besides the loss of time involved, of having this examination made for him. The records of the English courts show a vast amount of litigation which is thereby avoided. Instances are cited in which patents have been litigated for years at a cost ranging from £15,000 to £25,000, when at last it has been discovered that the invention was not novel. The writer sums up the argument on this point by saying;—"Moreover, it (this examination) prevails in a country which is more worthy to instruct us in patent matters than all European countries combined—the United States of America." The other respect in which the preference is given to our system is the relative cheapness of patents. This, evidently, is a wonderful stimulus to invention.

Engineering Schools.

We judge that "parents and guardians" are beginning to appreciate the value of instruction on practical subjects, or, to speak more postively, feel that by familiarizing their children or wards with science from their youth they will have something certain to rely upon when their majority is attained. We infer this from the number of institutions where engineering and other scientific studies are prominent courses. At the Delaware Literary Institute in Franklin, Delaware Co., N. Y., surveying, civil engineering, geometrical and mechanical drawing, as well as the construction of common roads and railroads are taught; lectures on the various elements, imponderable agencies, etc., are given, and the general course at the Institute is to make the pupils proficient in the modern professions. We understand that this institution is in a flourishing condition.

MEDALS FOR INVENTORS IN FRANCE.

We find in *L'Invention* a list of the awards of silver and bronze medals recently made by the French *Societe d'Encouragement Pour l'Industrie Nationale.* The principal awards of silver medals were as follows :—

MAKING GEISSLER TUBES.

The first medal was decreed to M. Alvergniat, Jr., for the introduction into France of the manufacture of those glass tubes which exhibit such curious electrical phenomena and are known as Geissler tubes. France as well as other nations had previously obtained these tubes wholly by importation from Germany.

DIAPHRAGMS OF BOILERS.

The second medal was for a beet root press. The third was bestowed upon M. Boutigny d'Evreux for his diaphragms for steam boilers, which the committee say are of great service in removing scale.

ELECTRIC LAMP.

It is sometimes necessary to enter an atmosphere of poisonous gas, to rescue persons who have fallen in it, or for some other purpose. This can be done by having in the mouth the ends of breathing tubes communicating with the free air. But if a light is required, an ordinary lamp would not answer the purpose, as it would be extinguished in the poisonous gas. Messrs. Dumas and Benoit have devised an electric lamp to be used in this case. It consists of a single galvanic battery, a Ruhmkorff coil, and a Geissler tube, all arranged in compact form. The Association say it has been tried successfully in the mines of Alais and Saint-Etienne, and they are therefore happy to decree the inventors a silver medal.

MAMUFACTURE OF GLASS AND EMERY PAPER.

The committee remark that the use of polishing paper dates from 1792. A manufactory of the article was established by Mr. Fremy in 1814, and his son M. Dumas Fremy, has now a manufactory at Ivry, which is a model establishment; both in the excellence of its products and in the care for health and well being of the workmen. A silver medal is, therefore, awarded to M. Fremy.

ELECTRO-MAGNETIC ENGRAVING FOR CALICO ROLLERS.

A silver medal was awarded to M. E. Gaiffe for an improved process of engraving copper rollers for printing calico by magneto-electricity. The process is not explained but an explanation is promised at some future time.

BEEF TENDONS FOR STEPS.

M. Gautron, a manufacturer of centrifugal machines, having experienced great difficulty in finding any material which would endure the severe friction at the bottoms of the shafts, finally succeeded perfectly with the tendons of beeves. His machines run at a velocity of from 1500 to 2500 revolutions per minute, but the tendons last a long time and require very little oil.

The report also says that these machines have been used with success in the manufacture of potato starch, producing an article of perfect whiteness and purity.

THE DYEING OF THE NINETEENTH CENTURY.

A medal was awarded to M. Grison for his work with this title.

BALANCES OF PRECISSION.

M. Hempel employs thirty workmen in manufacturing delicate balances for scientific investigations, and he received from the society a silver medal for the excellence of his workmanship.

BLOWING UP BUTCHERED ANIMALS.

A bronze medal was bestowed upon M. Beliard for an apparatus, consisting of vessels of compressed air and india-rubber tubes, for blowing up the skins of slaughtered animals to facilitate their removal. It is said to be more convenient for the butcher boys than the bellows at present in use.

IMPROVED MODE OF RAISING OYSTERS.

M. Kemmerer, of Saint Martin, Isle of Re, places the young oysters in cells formed in tile quite similar to the cells in which bees raise their young. This is said to cause a rapid and remarkably perfect development of the mollusk.

PETROLEUM.—The value of a tract of land on Oil Creek, Venango county, Pennsylvania, two miles in width and twenty miles long, is estimated at two hundred and fifty millions of dollars. Four years ago his land was hardly worth five dollars an acre.

CEMENTATION OF IRON BY CARBON FROM GAS RETORTS.

The last number of *Le Gaz* publishes a note from M. Caron, presented to the French Academy of Sciences by M. Sainte-Clair Deville, giving the result of an experiment with gas retort carbon for converting iron into steel. The experiment was suggested by a statement of M. Regnault, that in furnaces at Sevres the porcelain is blackened when it was placed in the neighborhood of a morsel of graphite from gas retorts, and that in the same circumstances iron is transformed into cast iron. M. Regnault inferred from this that gas retort carbon might be more active in the cementation of iron than charcoal.

M. Caron placed a bar of wrought iron, four-tenths of an inch square and a foot long, in an earthen tube filled with pieces of gas retort carbon, and buried it in a fire of similar carbon, where it was kept at a cherry red for six hours. On being removed it showed no traces of cementation.

On analyzing the carbon, M. Caron found it to be far more impure than had been supposed. It contained nearly one per cent of sulphur, and traces of potassa and soda. M. Caron says:—

"Thus, in the cementation which I have attempted to produce, I have put in contact with the iron a coal very sulphurous and containing no sensible quantity of free alkali. But I had previously demonstrated that in these circumstances acieration could not take place, because the production of alkaline cyanides was impossible. The result which I have obtained is therefore a confirmation of the theory of cementation that I announced six years ago."

He then repeated the experiment, but with the addition of 10 per cent of carbonate of potassa, and the cementation was easily effected. The same result was also produced by adding 10 per cent of natural carbonate of baryta.

ASPARAGUS A SUBSTITUTE FOR COFFEE.

Some two years since a patent was obtained by Mr. James P. Gage, of Staten Island, for the use of asparagus as a substitute for coffee. He asserts that the seed and root of asparagus are found to contain caffein, the peculiar principle of coffee, in larger quantities than the coffee berry.

Caffein can be extracted from coffee and obtained in white crystals by a chemical process which is not very complicated. The coffee is first soaked in ether which dissolves and extracts the caffein. The solution is then mixed with water, and the subacetate of lead is added, when the caffein is thrown down in a solid precipitate. After the removal of the excess of lead, and filtering, the caffein is obtained in white needles, slightly flexible and transparent, with a silky luster, feebly bitter, and free from odor. Coffee contains from $\frac{3}{5}$ to $6\frac{4}{10}$ per cent of caffein; the weakest being the St. Domingo, and the strongest that from Martinique.

If the root and seed of asparagus do really contain caffein in larger quantities than the coffee berry, it is a very interesting fact. We should like to see the matter tested by some of our chemists.

GOESSLING'S CORN-SUGAR PATENTS.

As we continue to receive applications for copies of Goessling's patents for making corn sirup, the claims for which were inadvertently forwarded on the 10th of May last, when the patents were not issued, we publish the following letter relating to the subject from the Commissioner of Patents:—

U. S. PATENT OFFICE, Feb. 16, 1864.

GENTLEMEN—No patents have been granted to F. W. Goessling, of May 10, 1864. Respectfully,

D. P. HOLLOWAY, Com.

MESSRS. MUNN & Co.

A patent was issued on the 20th of December, 1864, to Mr. Goessling, and the following is a copy of the specification:—

No. 45,561.—IMPROVEMENTS IN THE MANUFACTURE OF SUGAR.—F. W. Goessling (he having assigned his right, title and interest in said improvements to himself, H. F. Briggs and L. Bradley), Buffalo, N. Y.:

To all whom it may concern—

Be it known that I, Frederick W. Goessling, of the city of Buffalo, County of Erie, and State of New York (assignor to Henry F. Briggs, Lyman Bradley and myself), have invented or produced a new compound sugar, and I do hereby declare that the following is a full and complete description of the manufacture or compounding thereof.

The nature of this invention relates to the manufacture of a new article of sugar from a combination of cane sugar with corn sirup. I take a sirup made from Indian corn by any known process of making corn sirup or corn sugar; the process being carried to that point where the sirup is purified and rendered in a condition to granulate or crystallize.

I also take a quantity of cane sugar (any kind or quality of cane sugar will answer the purpose, and dilute it or reduce it to a liquid sirup and purify the sirup by any known process of purifying cane sugars and render it in a suitable condition for crystallization. These two sirups are then mixed or combined together for crystallization and conversion into a new compound sugar, the crystallizing process being completed, and the new sugar perfected after the combination of the two sirups. The crystalizing process may commence in each sirup before the two are combined, and be completed after their combination.

After the mixture of the two sirups, as above stated, the mixture will be in a thick semi-liquid state, and it is then transferred to the mold for the completion of the crystallizing process, and the further treatment by "liquoring" in a common manner.

The proportion of cane sugar or cane sirup used in combination with the corn sirup, is not definite or material, as a larger or smaller quantity will effect the purpose.

The object and effect of this combination is to induce the whole mass to crystallize in the same manner that cane sugar does, and to give the whole the taste and the qualities of cane sugar.

I also propose, in some cases, to use the sirups produced from wheat and other cereals, as a substitate for Indian corn sirup in combination with cane sugar, and for the same purpose as above stated.

What I claim as my invention, and desire to secure by Letters Patent, is a new and improved compound sugar made by a combination of cane sugar or cane sirup with corn sirup, substantially as set forth.

Good Books.

The new and enterprising publishing house of Messrs. Hurd & Houghton, No. 401 Broadway, have added to their large and valuable stock by the purchase of the entire list of publications of J. G. Gregory, consisting of J. Fennimore Cooper's Works; "Forest Pictures in the Adirondacs," by John A. Bowes; "A Selection of War Lyrics," with illustrations by Darley; "A Forest Hymn," by Wm. C. Bryant, illustrated by John A. Hows; "In the Woods," illustrations by John A. Hows; "Christmas Poems and Pictures," illustrated; "The Vagabonds," illustrations by Darley; "The Snow Image," by Nathaniel Hawthorne, illustrations in colors; "Spectoria," surprising spectral illusions; "Golden Leaves from the British Poets"; "Golden Leaves from the American Poets." This firm keep a general assortment of the best books to be found in the market.

A Valuable Patent.

The Hartford Arms Company, just organized for business, has a Government contract for 200,000 Hammond rifles, and has agreed to pay the inventor, a Bridgeport mechanic, $10,000 in gold or its equivalent in cash, $2 on each rifle manufactured, for the patent, and a salary of $2,500 as superintendent of their manufacture. The statement in some of the Connecticut papers that this arm has been selected out of thirty different models as the one for the United States service, is erroneous, as the military commission appointed to make a selection, and who have been in session in Hartford, have as yet reached no conclusion.

ANTIQUITY OF ZINC.—A strange discovery, if true, has just been made at Pompeii. The *Italia* of Naples states that a fountain has been discovered there, covered with zinc. It is added that this is the first time that the said metal has been found at Pompeii. We should think so; for though the ore was known to the Romans, the metal was not extracted from it, so far as our knowledge goes, until the sixteenth century, by Paracelsus.

STATISTICS show that cows in good condition require about thirty pounds of hay per day.

Flour Bolt, Duster and Cooler.

The nature of this improvement consists in the application of a blast of air of the ordinary temperature of the atmosphere, or below it, to the exterior surface of the bolting cloth, for the purpose of keeping the meshes of the cloth dry and clean, and at the same time cooling and drying the flour. The engraving illustrates the device, which consists of a conical-shaped tube, A (Fig. 2), made of zinc, tin, sheet-iron or any light substance, having one or two lines of perforations, B, or slots, running its length, or the length of the bolt reel, C. The tube is applied by passing it through the length of the bolt chest, above the center of the bolt reel, with the line or lines of perforations or slots directed towards the cloth and the center of the reel, and in close proximity to the bolt cloth. Air introduced under pressure at the large end of the tube by a fan, bellows, or air pump, throws a strong, sharp and even blast of air through the perforations, B, in the tube, against the exterior surface of the cloth, covering its interior surface at each revolution of the bolt reel.

Fig. 1.

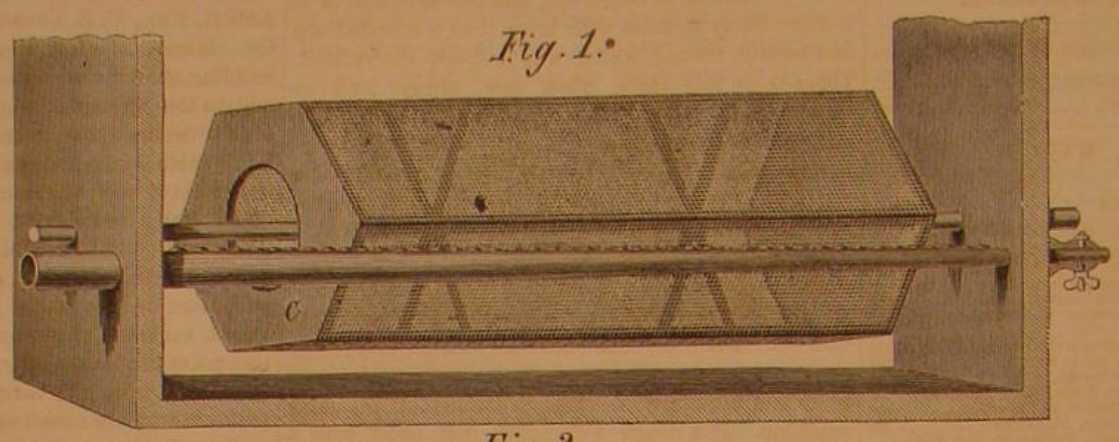
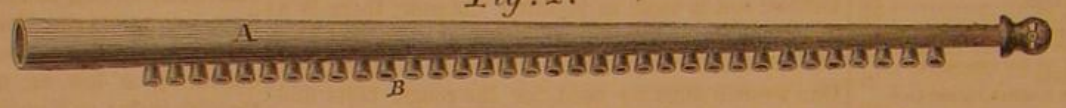


Fig. 2.



BOON & STEVENS'S FLOUR BOLT, DUSTER AND COOLER.

The advantages gained by this improvement are many, and will be readily suggested to the mind of every practical miller in the land. Some of its advantages are thus spoken of by Messrs. H. L. Bennett & Co., of Novelty Mills, Avon, Ill., who have one in use:—

"It keeps the meshes of the bolt cloth dry, clean and clear, thereby enabling a much finer bolt cloth to be used, and raising the grade of the flour. It greatly increases the bolting and grinding capacity. It also cools the meal directly after it is discharged into the bolt, thereby dispensing with other cooling apparatuses. The meal may be carried directly from the stones or grinding surfaces into the bolt, and the flour comes from it as cool as the air that is thrown into the bolt chest. In damp and warm weather, or in grinding damp grain, it produces a yield of from one to three pounds more of flour to the bushel. By keeping the bolt cloth dry, clean and cool, it adds to its durability. As the air that is thrown into the bolt chest can be of any desired temperature, the operation of grinding and bolting can be perfectly uniform at all seasons of the year and in all kinds of weather. Through the application of this cool dry air the moisture is driven out of the flour, and it is in a condition to be packed directly from the bolts, without danger of souring. A large amount of flour is annually lost by being packed too damp or in a heated condition. Flour by remaining for a length of time in a damp or heated state, if it does not actually sour, loses much of its value."

This invention was patented Dec. 6, 1864. For further information address Chas. L. Stevens, Galesburg, Ill.

Pumping Machinery.

We take the following paragraphs from the report of Chief Engineer Birkinbine, of the Philadelphia Water Works:—

"The dam at Fairmount was constructed by Mr. Ariel Cooley; the first crib was sunk on the 19th of April, 1819, and water flowed over the dam January 25th, 1821. Mr. Cooley died a short time prior to its completion, from the effects of exposure while building it.

"The over-fall of the dam is 1204 feet long; the mound-dam 270 feet, and the head arches 104 feet; making its whole length, including the Western pier, 1600 feet. It backs the water up the river for six miles."

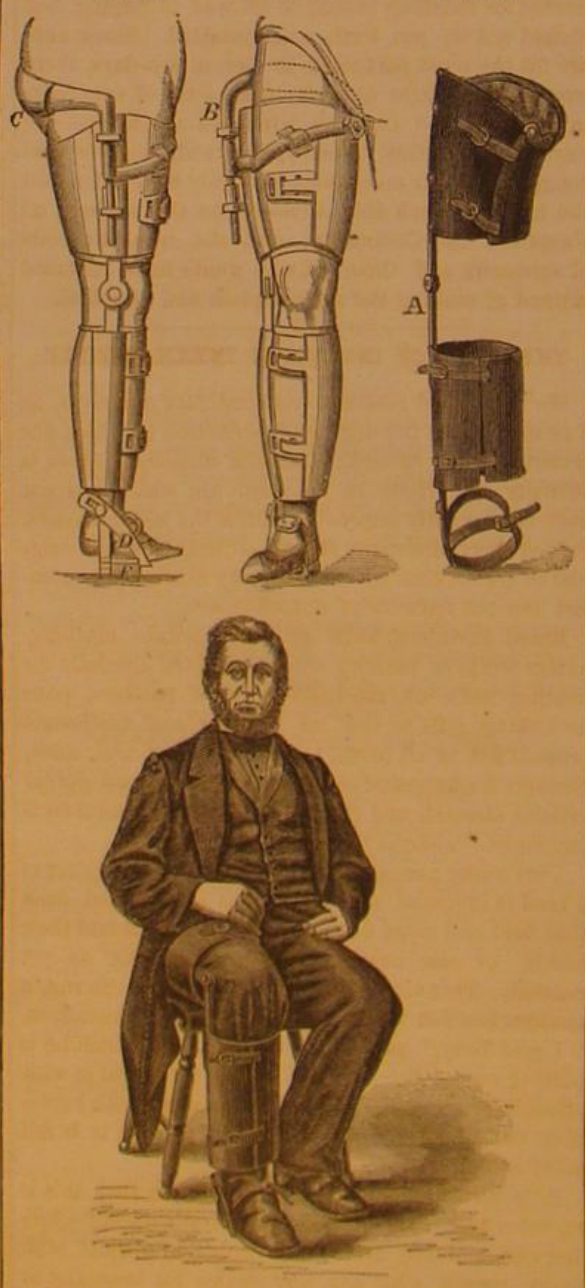
Respecting the Fairmount dam he says:—"Wheels Nos. 4, 5, 6, 7 and 8 were made as heavy as possible, under the mistaken idea that the increased momentum of the rim would give efficiency to the wheel. On account of this weight they cannot be kept in repair. It is necessary to be continually renewing the starts, buckets and soleing. The pumps connected with these wheels are, with the exception of that attached to No. 4, broken in some important parts."

And of some water wheels:—"The hot water heating apparatus placed in the new mill house answers the purpose; maintaining it sufficiently warm to the purpose; maintaining it sufficiently warm to prevent frost, and making it comfortable to work in without the annoyance of dust and gas, as was the case with the old stoves. The heat is diffused throughout the whole building better than with stoves, and with a large saving of fuel."

ALLEN'S SUPPORTER FOR FRACTURED LEGS.

The confinement consequent upon fracturing a leg is very tedious, and wears greatly upon the nervous system of some patients. Some time must necessarily transpire before the bones are firmly knitted so as to sustain the weight of the body, and unless crutches are used, convalescence is sometimes as hard to be borne as the pain from the injury. The object of this invention is to allow the patient to walk about and take moderate exercise, during recovery, whereby the general health is much benefited. No crutches are used and the wounded leg is undisturbed.

Fig. 3. Fig. 2. Fig. 1.



The body is supported entirely by metallic braces, as at A, in Fig. 1, and these braces are connected to a padded clamp, B, Fig. 2, which is sttapped to the thigh. The main support, A, has a joint at the knee so that the limb can be bent for walking or sitting down, and the lower end of the main support is bent under the foot, at right angles, so as to carry the foot and support the legs. Thus it will be seen that the body rests entirely upon this foot-piece and not upon the leg at all.

To prevent the leg from the possibility of coming in contact with the ground by slipping the pad, the body is further supported by another pad passing under the posterior portion of the frame, as at C, (Fig. 3), and there is an angle piece, D, at the bottom of the foot, which can be adjusted at any desired elevation so as to support the front part of it; a vulcanized rubber cushion, E, at the bottom of the whole, makes this supporter noiseless when used on uncarpeted floors or pavements, and prevents the iron from injuring furniture in the house when laid against it. The full length figure, which is published with the supporter applied, and worn in a sitting posture, shows the position of the several parts when so used.

The exact length of the supporting bar is not of great consequence, as individuals can be fitted with the apparatus especially; limited adjustment is possible, however, by the nuts on the thigh clamp, B.

When the patient is to be seated for any length of time, the clamp, B, can be taken off by unscrewing the nuts, and the instrument can be worn inside or outside of the pantaloons as desired. This appliance will doubtless be found useful for wounded soldiers, persons with sprained limbs and others. It is noiseless, has no squeaking joints, and seems in all respects desirable. A patent was procured on it through the Scientific American Patent Agency, on the 4th of October, 1864, by D. H. B. Allen, of Chelsea, Vt. Town, county and State rights for sale. For further information address the inventor as above.

Tellurium.

The curious metal, or metalloid, which Klaproth named tellurium, has hitherto been one of the rarest of known substances, found only in a very few localities—chiefly in Hungary and Transylvania—and there only in such minute quantities that its selling price in England has never, we believe, fallen below 10s. per ounce. In a paper, however, on the mineralogy of South America which is contributed to the January number of the *Philosophical Magazine* by Mr. David Forbes, F.R.S., we are told of an ore of bismuth which contains not less than five per cent of tellurium. This ore occurs in Bolivia, about two-thirds up the mountain of Illcampu, which is the highest of all the peaks of the Andes, towering to nearly 25,000 feet above the level of the Pacific Ocean. It is thus far from being convenient of access; still, the demand for bismuth has sufficed to set men mining it—at an altitude of 15,000 feet, and only slightly under the line of perpetual snow—so that we may expect tellurium, as well as bismuth to be soon very much cheaper than hitherto.

PETROLEUM INVENTIONS.—More than thirty patents were issued in the last six months of 1864 for inventions relating to petroleum, such as drills for boring wells, devices for removing paraffine and other obstructions from the veins of the rock, pumping and raising oil, lining oil barrels, etc. Many more applications still remain in the Patent Office unexamined, and, judging from the number of new cases we are constantly sending forward, the present year will be still more prolific of successful inventions in this profitable field.

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THE PRESSURE ON A SLIDE VALVE.

It is a popular idea that the number of square inches in the back of a slide valve, and the pounds of steam in the chest, represent the total pressure upon the valve. Another delusion is, that the pressure on a slide valve is equal to the pounds of steam per square inch on the back, minus the area of the steam ports. If we consider the valve to be a solid block of iron on a solid table, and mechanically tight, the steam would press on every square inch of surface with the same force that a dead weight laid upon it would. But these conditions are never found in a slide valve, except in one position; that one, when the valve laps over both ports, and the engine is at rest.

So soon, however, as the valve is moved the steam enters the open port and the pressure is practically taken off that end of it. When the valve is moved back over the port, the steam that is shut up within the cylinder will press up against the under side of the valve face with a force exactly equal to the pressure at the point in the stroke of the piston at which the valve closed. As the valve continues its stroke the other port will be opened, and the steam we have supposed shut up in the cylinder begins to exhaust; at this time, the pressure against the under side of the valve will be the pressure in the cylinder at the end of the stroke. This pressure is only for a brief period, however, for in a well constructed engine the time of exhausting the contents of the cylinder is very short. While the steam is entering the open port, then, and after the exhaust has passed through the closed port, the pressure on the under side of the valve will be just the ordinary back pressure, supposing the engine to be non-condensing—which is the supposition we have entertained in this discussion.

It is therefore unquestionable that to determine the pressure on a slide valve we must consider the pressure in the cylinder at the time of cutting off, at the end of the stroke, the area of the ports, the area of the back, and the back pressure on the piston.

THE REPORT ON SCREW THREADS.

The mechanical readers of this journal will be interested in the report on screw threads from the Committee of the Franklin Institute, which we publish in another part of this issue.

In common with the trade we have felt the necessity of uniform in this particular, and have lost no opportunity of calling attention to it.

In regard to the decision of the Committee we think it a wise one, and a happy conclusion of an arduous duty. They recommend the adoption of the V-thread, flat on top, and flat in the bottom of the space, with pitches varying, of course, with the size of the bolt. The standard can be found in the report.

The thread recommended for adoption has for a long time been the most popular with good mechanics, as a fair compromise between a square and a triangular thread, also on account of the ease with which it is made and its durability, so that there will be no prejudices to overcome, and the adoption of it is more likely to meet with favor than a rounded top and bottom thread, which was properly discredited. Threads of this class, when new, always look as though they were half stripped, and they tend to strip quicker than others, for the very act of stripping is caused by one thread mounting or riding over the other; rounded threads facilitate this very greatly, especially with fine pitches.

In regard to the sizes for rough and finished nuts, there are some who will disagree with the decision of the Committee. They recommend that finished nuts and bolt heads be one-sixteenth smaller every way than rough nuts. It frequently happens that rough bolts and nuts are in close proximity on the same machine. If a rough five-eighth bolt head, with a finished nut is used, as is often the case, there is a difference in proportion apparent at once, and two wrenches must be provided where one would suffice. One wrench must be used for the rough bolts and another for the finished ones, and it is more likely that the largest wrench will be frequently used by careless men, on the smallest nuts, so that the corners will soon be rounded off. If we suppose that screw wrenches are always at hand, then these objections have no weight; but wrenches of that class are not always to be had, and when we speak of wrenches, it is of permanent ones, which are always sent with machines. There should be but one size for rough bolt heads and nuts and finished nuts; the excess for finishing should be allowed in forging, but should not be put forth as a standard. Since nuts are for the most part made in dies, now-a-days, there would be but little difficulty from want of exactness in the angles, so that the wrenches would fit. We have no disposition, to be hypercritical, however, and congratulate our mechanics that they have fallen into the hands of such able advisers on this subject, as composed the Committee, and not into the toils of schemers and theorists who would have confused instead of making the subject plain and practical.

THE FIELD OF INVENTION INEXHAUSTIBLE.

We have good reason to congratulate ourselves, as a people, upon the degree of perfection to which our inventors have brought domestic utensils. There is scarcely an article in common use which has not been very greatly improved within the last few years. Indeed there are many things entirely new and original in conception which add very much to the comfort and convenience of housekeepers.

Bread kneaders, knife scourers, potato mashers, butter workers, laundry stoves, adapted specially for heating sadirons, mechanical coffee roasters, pans for baking rolls so that an inviting and toothsome crust is left on all parts, top and bottom and sides, cleaners for kerosene oil chimneys, these and similar articles abound, and the modern American kitchen is incomplete without them.

Very many persons imagine that after one thing of a kind is invented every one else is excluded from that field and must ever after sit down and fold their hands, or else cast about for something as yet untried. This view is an erroneous one. Sterne, a modern English writer, makes one of his characters, "Uncle Toby," say to an intrusive fly which he is putting out of the window—"Go, the world is wide enough for me and thee." It is the same with invention, the world is wide enough for all, and it is not every article that suits all tastes.

It is fortunate for the general welfare that this is so, otherwise there would be no trade except a limited one, and the arts would come to a stand still. Every person who has any device for lessening or expediting work or performing it in another manner should see that it is brought prominently before the public without delay.

THE Chicago-Lake-Erie tunnel progresses at the rate of twelve feet in twenty-four hours.

IMPORTANT ENGLISH PATENT LAW CASE.

We are indebted to Mr. Hayes, Chief Clerk of the Patent Office, for the report of proceedings in the Court of Queen's Bench, on a demurrer, to the declaration in a petition of right claiming damages against the British Government for infringing a patent granted to Robert B. Feather for certain improvements in the construction of ships. The report of the trial was forwarded to Mr. Hayes, by George J. Abbott, Esq., U. S. Consul at Sheffield. The patentee claims to effect considerable economy in the building of ships or vessels, and at the same time add to the strength, buoyancy, and durability, and also to secure them against more extensive or fata injury arising from leakage in the constructing of ships or vessels of wood and iron combined, or what the patentee terms union-built vessels. The bottom and lower part of the frame of the hull of the vessel is to be constructed of timber, as heretofore, to about one-half, more or less, of the perpendicular hight of the vessel, exclusive of the bulwarks or top sides. From that point or mark, upwards, the vessel must be constructed of iron. To carry out this object sheets or plates of iron are raised upon stanchions or ribs made sufficiently strong, and formed with equalized saddle bars, set across the timber heads, main walls, and ceilings, over the futtocks to the keel inside, and outwardly as low as necessary, and firmly-bolted through them; or if preferred or considered more advantageous, the iron ribs or stanchions, with requisite receiving plates, could be introduced at suitable distances as for entire iron vessels. The intervening spaces between the ceilings and the walls are intended to be filled in solid to a sufficient depth to receive the bolts and fastenings of the iron ribs or stanchions, the upper portion of the main walls being laid diagonally either way, with a view to increased strength. The stem and stern post to be entirely of timber or of iron from the line of the union streak upwards.

The petitioner claimed damages to the extent of £10,000 sterling for infringement of his rights.

The Attorney General, who appeared to support the demurrer, argued, first:—"That these Letters Patent of inventions—and particularly this now before the court—are to be construed according to the general principles of law applicable to Crown grants, and that being so they will be found not to restrain the Crown from using an invention, or the grant of any privilege whatever as against the Crown. Second—That if the contrary construction were put upon such Letters Patent, particularly like that in this case, which relates to alleged inventions of the naval and military defence of the country, such Letters Patent would be against public policy and simply void as to restraining the Crown from its use. Third—That when we come to examine the statutes and authorities as to Letters Patent of inventions they will be found to contain nothing to invalidate but rather to support that conclusion. And, lastly, I submit if these arguments should fail to recommend themselves to your judgment, and you should hold against me on every one of these points, then the necessary consequence of such a conclusion is that the Crown is not liable on a petition of right; but if wrong has been done by individuals, whether by the Lords of the Admiralty or any other persons—if that be so, then the remedy is not by petition of right against the Crown, but by action against those who did the supposed wrong."

Mr. Bovill, who appeared for the petitioner, contended that there was not a trace in the experience of any living man of the Crown having asserted its right to use patents without payment to the patentee. And the astounding proposition is announced now for the first time that the Queen is entitled through the public departments to take what is the supposed private property of individuals and appropriate it without remuneration. In 1816 Sir William Congreve, who was then the director of the Artillery Department at Woolwich, was restrained from the use of Mr. Walker's patent. Sir William Congreve had supplied certain articles, and he was charged with a breach of the patent, and he was restrained by injunction, but it was not set up that Sir William Congreve was at liberty to use the invention for the good of the public service. Lord Eldon considered Sir William Congreve was not entitled to use the patent, but from the urgency and necessities of the case he was allowed to supply the articles for the

Government, an account, however, being kept for the remuneration of the patentee. The power of the Crown has reference only to the granting of a privilege, and not to any right in the invention, having no knowledge of it, and it was very different from those grants where there was some prerogative right, or a presumed prerogative right, possessed by the Crown, such as a grant of a fair or market and franchises of that character. After referring to the several authorities quoted by the learned Attorney General, he said:—

"If the case is to be de ermined with respect to considerations of public policy, how can any officer of the State rise up in his place and say it is public policy, in all cases of munitions and implements of war, to drive every inventor to foreign countries, because the inevitable result, if their lordships' judgment should be in favor of the Crown, will be to do that."

Mr. Bovill hit the nail square on the head; and we do not see how any sensible man can adopt any other view of the matter. The Lord Chief Justice, however, intimated that judgment in the case would be rendered in favor of the Crown, on the maxim, we suppose, that "the king can do no wrong."

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:—

Grain and Grass Harvester.—This invention relates to an improved sickle-driving mechanism, whereby a requisite speed may be obtained by a very compact arrangement of parts. The invention also relates to a novel manner of applying the seat to the machine whereby the weight of the driver is made to act in the most favorable manner towards balancing the machine and in assisting in elevating the finger bar. The invention also relates to a lever applied and arranged in such a manner, relatively with the draught pole, as to cause the outer end of the finger bar to be elevated when the inner end of the same has been elevated a certain hight. The invention also relates to a new and improved shoe arranged and applied in such a manner as to support the front part of the machine and partially sustain the finger bar so that it will run lightly over the surface of the ground, and at the same time serve to protect the pitman which drives the sickle. The invention further relates to a novel manner of attaching the finger bar to the main frame of the machine, whereby a strong and durable joint connection is obtained. Frederick Nishwitz, of Brooklyn, N. Y., is the inventor.

Arrow Projectile.—This invention consists in the application to a projectile of a telescope stem provided with wings in such a manner that when the projectile is prepared for use said stem can be contracted within the limits of the cartridge bag, but when the charge is fired, and as soon as the projectile leaves the muzzle of the barrel, the stem elongates by its own inertia and gives balance and steadiness to the projectile in its flight, thereby increasing the range, velocity, and also the certainty of striking the object fired at. The wings being secured to the tubular end of the stem do not interfere with the revolving motion of the projectile if the same is fired from a rifled barrel. The stem is secured to a cap which is perforated with holes, and from the outer surface of which rises a rim with an internal screw thread which screws on the inner end of the projectile, leaving a shoulder for the soft metal ring to rest on, in such a manner that when said cap, with the telescope stem contracted, is introduced into the cartridge bag, said bag can be readily filled with powder through the perforations in the bag, and by screwing the projectile down into the rim of the cap, the edge of the cartridge bag is clamped between the soft metal ring and the shoulder of the cap, and no further fastening is required for it. Capt, Thomas S. Orwig, 219 Broadway, New York, is the inventor.

Rotary Engine.—This invention consists in two revolving piston wheels connected together by cog wheels and placed concentrically in two adjoining cylinders in combination with a valve which occupies the channel leading from one cylinder to the other, and to which motion is imparted by concentric or other equivalent means, mounted on the shafts of the piston wheels, in such a manner that said piston wheels and intervening valve are alternately acted upon by the steam passing through the channel connecting the two cylinders, and that by the action of the valve and piston wheels *one* cylinder takes steam while the other exhausts, and *vice versa*. The cog wheels which gear the two shafts of the pistons together are eccentric, the same as the pistons, so that their circumferential speed corresponds with that of said pistons. *John P. Eills*, of 22d. Reg. Wis. Vol. Inf., Nashville, Tenn., is the inventor.

MARKET FOR THE MONTH.

The peculiarity in the trade during the month of February is the absence of fluctuations in the price of gold and other commodities. The prices of the leading staples on the 22d, compared with those on the last Wednesday in January, were as follows:—

	Price Jan. 25.	Price Feb. 22.
Coal (Anth.) ₱ 2,000 lb.	$12 00 @12 50	$14 00
Coffee (Java) ₱ lb.	47 @ 38	47 @ 48
Copper (Am. Ingot) ₱ lb.	45 @ 46½	44 @ 45
Cotton (middling) ₱ lb.	84 @ 85	83 @ 84
Flour (State) ₱ bbl.	$9 20 @ 9 70	$9 80 @10 40
Wheat ₱ bush.	Nominal.	2 50 @ 2 80
Hay ₱ 100 lb.	$1 50 @ 1 90	1 70
Hemp (Am. drs'd) ₱ tun.	320 00@390 00	$320 00@390 00
Hides (city slaughter) ₱ lb.	13 @ 13½	13 @ 13½
India-rubber ₱ lb.	72 @ 1 20	72 @ 1 15
Lead (Am.) ₱ 100 lb.	13 00	13 00
Nails ₱ 100 lb.	$8 50 @ 9 00	8 50
Petroleum (crude) ₱ gal.	45 @ 45½	45
Beef (mess) ₱ bbl.	$19 00 @24 00	18 00 @24 00
Saltpeter ₱ lb.	30	30
Steel (Am. cast) ₱ lb.	19 @ 34	19 @ 34
Sugar (brown) ₱ lb	16 @ 22	15 @ 20
Wool (American Saxony fleece) ₱ lb.	90 @ 1 10	90 @ 1 10
Zinc ₱ lb.	18 @ 19	18 @ 18½
Gold	2 05	2 01



ISSUED FROM THE UNITED STATES PATENT-OFFICE

FOR THE WEEK ENDING FEBRUARY 21, 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.

46,435.—Horse Rakes.—Hubley Albright, Lewisburgh, Pa.:

I claim, first, The arrangement of the teeth bars, H, and bent rod, E, the latter being attached to the axle, A, as shown, and in such a relative position with the rake teeth, I, to operate as and for the purpose set forth.

Second, The lever, F, in combination with the bars, H F L, and the springs, O, all arranged and for the purpose specified.

46,436.—Rotary Engines.—Wm. Avens and Frederick Fradley, Brooklyn, N. Y.:

We claim the wheel, A, with one or more sets of chambers, B, which are provided each with two channels, d d', situated at opposite corners, in combination with ports, e e', valves, J, and cylinder, F, all constructed and operating substantially as and for the purpose set forth.

[This invention consists in a wheel provided with two sets of chambers, to each of which access is had by two channels situated on the opposite ends of the chambers, and tapering off in opposite directions, in combination with a cylinder fitting closely to the circumference of the wheel, and with valves which open and close the steam ports in such a manner that by admitting steam to the chambers of the wheel a rotary motion may be imparted to the same in either direction, and by a simple movement of the valves the motion of the engine can be reversed at any moment.]

46,437.—Bomb Lance for Killing Whales.—Silas Barker, Hartford, Conn.:

I claim, first, The arrangement of the mode of separation of the lance head, C, and fuse tube, F, from the shaft of the lance, substantially as described.

Second, The arrangement of the adjustable hollow exploding lance head, C, in the manner and for the purpose substantially as herein set forth and described.

46,438.—Adjustable Tool Holder.—Charles Petit Benoit, Detroit, Mich.:

I claim the adjustable holder, B, swiveled in the end of the stock, A, so as to adapt the tool for various kinds of work, substantially as set forth.

Second, In combination with a tool-holder, constructed and mounted as above specified, I claim the washer, E, having grooved or roughened surfaces, and employed in connection with the nut, C', for retaining the tool-holder in position, as explained.

46,439.—Machine for Riving Hoops.—George J. Bentley, Michigan City, Ind.:

I claim the combination of the grooved wheel, D, with the discs, F and F', the latter being suspended in hanging bearings, substantially as set forth.

46,440.—Churns.—Edwin L. Bergstresser, Berrysburg, Pa.:

I claim the double-acting dashers, with the steam reservoir and pipe, arranged and combined as herein described.

46,441.—Brushes for Cannon.—Paul Birchmeyer, Syracuse, N. Y.:

I claim as an article of manufacture an artillery sponge, constructed as described, that is to say, by laying a mat of horse or horned-cattle hair around a central hollow stock or head, and fastening it by a wrapping wire into the spiral groove, the semi-globular end being made by looping in a portion of the mat, as described.

46,442.—Weft-feeding Device for Hair-cloth Looms.—John Blanchard, Pawtucket, R. I. Ante-dated Feb. 16, 1865:

I claim the improved feeder for a hair-cloth loom described, constructed and operated substantially as herein specified.

46,443.—Leather and Process of Manufacturing the same.—Guiseppe Bottero, Boston, Mass.:

I claim the process above described, as well as the material or manufacture produced thereby.

46,444.—Street-lamp Posts.—Philip H. Branson, St. Louis, Mo.:

I claim as a new manufacture a lamp post, constructed in two parts, substantially in the manner and for the purpose herein set forth.

Second, I claim the employment of the chipping strips, C''', substantially as and for the purpose set forth.

46,445.—Variable Exhaust Nozzles.—Myron E. Brown, Buffalo, N. Y.:

I claim, first, Making a conical nozzle in two parts or halves, the said halves being hinged at the base, and so constructed that they lap past each other, so that when expanded by being moved upon their hinges, the lapping parts will prevent any break or opening between the halves, substantially as described and for the purposes set forth.

Second, I claim the flange, C', projecting inwardly inside the nozzle, for the purpose of breaking joints between the seat and base of the nozzle, and thus, by carrying the flange above the joint, prevent steam from escaping at the bottom of the nozzle, substantially as described.

46,446.—Tanning.—Church Burton, Union, Maine:

I claim the tanning of hides and skins with evergreen *boughs*, such as spruce and fir.

46,447.—Revolving Hay Rakes.—Ezra Calderwood, Portland, Maine:

I claim the combination with the thill, A', of the box, D, movable cap, c', and spring bolt, G, the latter engaging with the notched or recessed wheel, E, upon the rake head, all as herein described.

[This invention relates to a new and improved revolving rake, to be drawn either manually or by a horse, and it consists in a novel and simple means employed for holding the rake in working position, and which will admit of being readily actuated to liberate the rake, so that it may revolve and discharge its load when necessary.]

46,448.—Machine for Cutting Pasteboard.—Elizur E. Clarke, New Haven, Conn.:

First, I claim the method herein described of cutting pasteboard, by combining with fixed cutters and revolving cylinder a mechanism for raising and lowering the said cylinder to and from the cutters at given intervals of space, to more or less or not at all indent the pasteboard, or to produce a through cut at pleasure, substantially as set forth.

Second, I claim combining in one machine two cutter bars, provided with adjustable or fixed cutters, with two cylinders geared so as to revolve with equal velocities, one of the said cylinders revolving in fixed bearings, while the other, actuated by suitable mechanism, is raised to or lowered from the cutters, as herein described.

Third, In combination with adjustable or fixed collars and revolving cutter cylinder, I claim a cam cylinder, or wheel revolving in unison with the cutter cylinder, and actuating it to more or less impinge against the cutters at given intervals of space, substantially as set forth.

Fourth, I claim the combination with the cutters, cutter cylinder and cam wheel, a feed bar, actuated by the cam wheel, or any part, moving in unison therewith, in such manner as to feed the sheet to the cutters automatically and at proper intervals of time during the revolution of the cam wheel, to receive the through and score cut between given points, substantially as set forth.

Fifth, I claim the combination of the grooved and flanged disk, with detachable cams and clamps and screw bolts to fasten the cams to the periphery of the wheel, substantially as set forth.

Sixth, In combination with a machine for cutting pasteboard, I claim a sliding and adjustable platform, a table for receiving the scored and cut sheets, the arrangement being such that the said table may be slid under the main cylinder, so as to admit of the operator approaching the cutters to adjust them, substantially as set forth.

Seventh, I claim the combination of the cutter-holder and stock, fitted together by means of a vertical tongue and groove, with one or more horizontal guide tongues on the back of the stock, and fitting and sliding in a corresponding groove or grooves in the cutter bar, or the projecting studs or the cutter stock lapping over and under the cutter bar, together with a binding bolt passing through the central guide tongue, substantially as set forth.

Eighth, I claim the forked arm and grooved screw nut, working in combination with the inverted T-groove in the side of the cutter bars, with the binding screw bolts and nuts, substantially as described, for the purpose specified.

46,449.—Medical Compound.—Alfred P. Coryell, Janesville: Wis. Ante-dated Feb. 16, 1865:

I claim the use of a compound made of the ingredients above specified, mixed together in about the proportion, and substantially in the manner set forth.

46,450.—Horse Hay Forks.—James A. Cowles, Chicago, Ill.:

First, I claim the combination of the key or right-angled lever, f, with the bail pivoted at the eyes, p p, when said bail is located in the described situation, with the handle, c, and head, a a, as and for the purpose herein set forth.

Second, The combination of the head, a, handle, c, key or right-angled lever, f, catch, o o, and bail, in the manner and for the purpose described.

46,451.—Door Fastener.—Elliott H. Crane, Jonesville, Mich.:

I claim the combination of the segmental latch piece, B, vibrating on a pivot within a slot of the plate, A, and actuated by the spring, C, by which the plate being fastened in position the closing door forcing back the latch piece, which is forced to return when the edge of the door has passed it.

[This is a pocket contrivance, designed for use wherever a convenient temporary door lock is wanted. The improvement relates to a peculiarity of construction, by which a spring bolt is employed in such a manner as to have an automatic action, so that by the act of closing the door the latter becomes locked. This is a device that everybody wants, for it can be instantly applied to any door, without screws or nails.]

46,452.—Clothes Dryer.—Ephraim Culver, Shelburne, Mass.:

I claim the combination of the slotted and movable arm, c, the movable brace, d, and hub, i, and the screw and nut, e, substantially as and for the purpose described.

46,453.—Fishing-line Sinkers.—Ebenezer F. Deck, Southport, Maine:

I claim as my invention the combination of the guard ring, the line, the swivel, the sinker and the arms, D B, the whole being arranged substantially as specified.

46,454.—Plows.—John Deere, Moline, Ill.:

First, I claim the combination of the landside side, A, with the solid lugs, 3 3 3, and the perforated ear, 5, substantially and for the purpose set forth.

Second, The lug, 3, cast on the landside, substantially and for the purpose set forth.

Third, The guide and fastening ear, 5, in combination with the movable standard, substantially as and for the purpose set forth.

Fourth, The combination of the landside standard and mold-board, by means and in the manner substantially as described.

Fifth, The construction of the shear, C, with the perforated ear, 5, substantially as and for the purpose set forth.

46,455.—Soap-stone Stove.—Porter Dodge, Perkinsville, Vt.:

First, I claim constructing and arranging the corner pieces, C, of the iron skeleton frame of a stove, so that they hold the soap-stone slabs and the outer open iron work, substantially in the manner described.

Second, In combination with the corner pieces, C, secured to the bottom of the stove, the top piece, D, for the purpose of holding both the corner pieces and the top slab, E, of the stove, substantially in the manner described.

Third, The combination and arrangement of the inner linings, L, with the outer slabs, B, when constructed and applied substantially as and for the purpose described.

Fourth, The combination and arrangement of the iron skeleton frame with the soap-stone sides, B, and top, E, inner linings, L, outer iron work, F, and stovepipe attachment, substantially as and for the purposes set forth.

46,456.—Car Seat Lock.—Arad Duncan and John M. Ziegler, Aurora, Ill.:

I claim the combination of the bolt, E, pin, d, cam, D, spring, a, and barrel, A, when constructed and arranged as herein specified, so that when in its operative position the said bolt will project from its case, but be free to spring within the same in closing, and when reversed will be held within its case by the action of the cam and pin.

[This invention consists in the employment or use for a car-seat lock of a revolving bolt, secured in a round case, and provided with a projection, which, by traveling on an inclined plane or cam, as the bolt rotates, causes the cam to recede in such a manner that an ordinary spring bolt or latch, with a round flanged case or barrel can be readily opened and closed by means of a key, which serves to impart to said bolt a revolving motion, and a lock is obtained which can be easily applied to a car seat, or any other article, simply by boring a hole large enough to receive the barrel, and securing the same by screws passing through suitable holes in its flanges.]

46,457.—Rotary Engines.—John R. Ellis, Co. F, 22d Regt. Wis. Vols:

I claim the revolving piston wheels, D D', which are placed eccentrically on shafts, C C', and geared together by eccentric wheels, F F', to operate in combination with the adjoining cylinders, B B', and intervening valve, E, substantially in the manner and for the purpose herein shown and described.

46,458.—Scythe Fastening.—Moses R. Flanders, Ilion, N. Y.:

I claim the scythe fastening consisting of the heel guard, A, heeband, B, heel plate, E, and heel ring, C, when constructed and combined substantially as set forth.

46,459.—Magazine Fire-arms.—Valentine Fogerty, Boston, Mass.:

I claim, first, The reciprocating grooved rack, D, suspended by ears, d, from a bar, b, and actuated by a rod, C, the said rack operating in combination with the grooved magazine, A g, to forward the cartridges, a a, as herein described.

Second, In combination with the above, I further claim the elongated holes, b, in the ears, d, to permit the vertical or lateral motion of the rack, as and for the object specified.

[This invention consists in certain improvements in the class of fire-arms known as "magazine guns," in which the cartridges are moved up to and delivered at or into the breech of the piece automatically in regular succession.]

46,460.—Sawing Machine.—Joseph Frey, Battle Creek, Mich.:

I claim the arrangement in a sawing machine of the saw, L, guide L', saw frame, L2, spring, G, levers E L4 J1, pitman, h, crank wheel H, worm, A, rod, I, pinion, B, tumbling shafts, C C', and roller, D, the whole constructed and operating substantially as herein set forth.

46,461.Machinery for breaking Quartz, &c.—Eli P. Gardiner, New York City:

I claim, first, The combination and arrangement of the arms, D D', hung upon centers at unequal distances from the faces, with the operating shaft, G, and cranks and shackle bars, H H, the whole operating together in the manner and for the purposes described.

Second, I claim the combining and arranging and operating the sieves and trough with the reciprocating arms in the manner and for the purposes specified.

46,462.—Quartz Crusher.—Perry G. Gardiner, New York City:

I claim, first, The combination and arrangement of the vibrating bush blocks, G and H, and the pillar blocks, D, operating in the manner and for the purposes described.

Second, I claim the combination of the bush blocks, double-joint and pillar blocks, with the hollow shaft and basin, acting in the manner and for the purposes described.

Third, I claim the manner of strengthening and supporting the sides of the basin by means of the bands or straps, N, having their bearings in the ring or bush block, M, whereby support is given to the basin so that it can be constructed with less weight of metal than would otherwise be required.

Fourth, I claim the combination of the vertical shaft, I, the forked arm, K, and the inclined shaft or axle, L, with the basin whereby the progressive oscillatory but not rotating motion is given to the basin by the rotation of the vertical shaft, I, as described.

Fifth, I claim the combining and arranging of a rake, P, with the inclined shaft, L, and the basin, F, so as always to be in front of the ball and to oscillate with the basin and shaft, for the purposes and in the manner described.

46,463.—Dredging Machine for Harbors and Rivers.—Andrew J. Gove, San Francisco, Cal.:

I claim the scoop or dredger, D, in combination with the scow, C, or other convenient vessel, the spars or braces, S S', the various lanyards and guys, and the compensating weights, W W, substantially as described, and for the uses and purposes as hereinbefore set forth.

46,464.—Method of Uniting Rubber Rolls to Shafts.—Wm. H. Grant, Winchendon, Mass.:

I claim the method of uniting rubber rolls to shafts substantially as set forth.

46,465.—Car Coupling.—Philip I. Gross, Manheim Center, N. Y.:

I claim the frames, C, fitted on pivots at the front of the drawbars, A, and provided each with a hook, E, attached to an arbor c, and also provided with a vertical rod, d, in connection with the pawls, H, attached to the pivoted frames, I, all arranged in connection with springs, to operate in the manner substantially as and for the purpose herein set forth.

46,466.—Impregnating Fibrous and Porous Materials—Stuart Gwynn (assignor to Alfred B. Ely), New York City:

I claim impregnating cloth, paper, or other fibrous or porous substances with the composition above described, for the purposes set forth.

46,467.—Beehive.—John Harper, Hillsborough, Iowa:

I claim the arrangement of the comb bearers, A, stand, S, lighting board, B, and house, E F, when constructed substantially as described and for the purposes set forth.

46,468.—Harness Snap.—Horace Harris, Newark, N. J. Ante-dated Feb. 12, 1865.

I claim the extension of the spring, A, in combination with the knob, C, and the hook, B, for the purposes herein set forth.

46,469.—Railroad Ticket-holder.—J. O. Harris, Ottawa,

I claim the combination of the herein described plate, the socket or clasp, b b, and the spring or clasp, b' b', arranged and operating substantially as and for the purposes herein shown and set forth.

46,470.—Steam Engine.—Wm. Cleveland Hicks, New York City:

I claim the combination and arrangement of steam machinery operating substantially in the manner herein set forth.

46,471.—Lamp.—James Ives, Mount Carmel, Conn.:

I claim, first, A combined globe and chimney base or seat, substantially as and for the purpose set forth.

Second, So suspending the lamp and a globe and chimney that the movement of the lamp downward will cause an upward movement of both the chimney and globe, substantially as and for the purposes set forth.

Third, The rods, G G', passing through the base, D, substantially as described.

Fourth, The combination of the rods, G G' and I I', with the stay and guard plate, H, base, D, lamp, A, and chains, J J', substantially as and for the purpose set forth.

46,472.—Window-sash Supporter.—Henry F. Jenks, Providence, R. I.:

I claim the arrangement of the spring, D, the frame, C, and the hooked finger piece, E, constructed and operating substantially as described.

46,473.—Apparatus for the Manufacture of Illuminating Gas.—James Jennings, New-York City:

I claim the bench constructed substantially as described for the purpose specified.

46,474.—Combined Thrashing Machine and Straw Cutter.—Daniel Kaufman, Boiling Springs, Pa.:

I claim the combination of the toothed cylinder, C, and toothed concave, D, arranged so as to be capable of being reversed in position, and provided with teeth beveled or sharpened at one side and broad or blunt at the opposite side, to form a combined fodder cutter and thrashing machine, substantially as set forth.

[This invention consists in the employment or use of a rotating cylinder provided with teeth beveled or brought to an edge at one side, in combination with a concave provided with similar teeth and placed below the cylinder, said parts being placed within a suitable box or case, and arranged in such a manner that the device may be changed from a fodder cutter to a thrashing machine and vice versa by simply reversing the position of the cylinder and concave.]

46,475.—Friction Mechanism for the Warp Beam of Looms.—Orin Kenison and Andrew J. McClary, Lawrence, Mass.:

What we claim as our invention is the combination of the stationary bracket, M, the screw, N, and hook, O, or their mechanical equivalent or equivalents, with the lever, I, and the friction strap, F, when the latter are applied to the loom frame and the warp beam substantially as specified.

46,476.—Apparatus for Stirring and Cooling Lard.—Alexander G. Knapp, New York City:

I claim the employment or use, for the purpose of stirring and cooling lard, of the serpentine or spiral dashers, C C and D, constructed substantially in the manner herein shown and described.

46,477.—Apparatus for Inhaling Pure Air.—Benjamin I. Lane, South Framingham, Mass.:

I claim, first, The construction of the reservoir, A, with a valve, a, and hand straps, b, substantially in the manner and for the purpose described.

Second, The combination of adjustable elastic straps with the air reservoir, A, valve, a, substantially in the manner and for the purpose described, whether the straps be the means of attachment to the body or other means for this purpose be employed.

Third, The combination of the mask, C, furnished with the three contrivances, B g h, or their equivalents, with the cock, p, and reservoir, A, furnished with the valve, a, all substantially in the manner and for the purpose described.

Fourth, The device, h, for allowing the wearer of the apparatus to inhale fresh external air when it is safe to do so, in combination with an air reservoir which has its air under control of a cock, p, substantially as and for the purposes set forth.

Fifth, The use of one or more elastic straps, c c, applied to the flexible reservoir, A, for attaching the latter to the body, and also for keeping up the supply of air to the respiratory organs, substantially as described.

46,478.—Drilling Machine.—Isaac S. Lauback, New York City:

I claim, first, Combining and uniting the two adjustable brackets, Q and W, by means of the adjustable connecting rod, r, fitted with one or more universal joints, the one of said brackets to be combined with the driving head, and the other with the spindle head of the machine, substantially in the manner described for the purposes specified.

46,479.—Wood-bending Machine.—John Philip Lebzetter, Lancaster, Pa.:

I claim the winged levers, E E, held by pivots or hinges on the drum, in combination with the spring or springs, H, or their equivalent, for retaining them.

I also claim the eccentric lever, L, on its vertical shaft, F, for shifting it up and down, in combination with the slotted hook, k, wedge, P, and rod or shaft, R, arranged and operating substantially in the manner and for the purpose specified.

46,480.—Combined Seeder, Cultivator, and Roller.—James P. Long, Osage, Iowa:

I claim the combination of the seed cylinder, E, adjustable frame, F, tubes, L, and distributers, L', cultivator teeth, M, and roller, B, the several parts being arranged and operating as and for the purpose specified.

46,481.—Sash Fastener.—W. C. McGill, Cincinnati, Ohio:

I claim the arrangement of the pair of gravitating latchers, E e e', and, F f, and of the operating crank, H G, the whole being formed combined and operating substantially as set forth.

46,482.—Railroad.—Richard Montgomery, New York City:

I claim, first, The use of corrugated iron beams in the construction of aerial railroads substantially as set forth.

Second, The use of flat beams or bars of iron for connecting the ends of the rails together and also for connecting and fastening the columns of support to the cross ties in the manner and for the purpose set forth.

Third, The use of corrugated iron rails in combination with corrugated iron cross ties and corrugated iron columns of support in the construction of aerial railroads.

46,483.—Coal Stove.—James Morrison, Jr., Troy, N. Y.:

I claim, first, The employment of a vertical grate and frame, I, with the downward recess, E, and horizontal grate, o, therein in combination with the dumping and vibrating grate, F, in the manner and for the purposes substantially as herein set forth.

Second, I claim the combination with a stove a grate so constructed and arranged that the clinkers or like draught obstructing material may be removed from any point or place at or just above its surface without dumping said grate, in the manner substantially as herein described and set forth.

Third, I claim the special arrangement and combination of the iron ring, G', containing the air chamber, G, and communicating with the fire at the sides of the fire chamber by means of numerous small apertures with the tiers of fire brick, K, and, K', surrounding the fire chamber above and below the said iron ring in the manner substantially as herein set forth.

46,484.—Jack for Pegging Boots, etc.—A. W. Moore, Stafford, Conn. Antedated Feb. 12, 1865:

I claim the employment of one or more cams, F, in combination with the holder, B, and the socket plate, A, arranged and operating substantially as and for the purpose described.

46,485.—Ejector for Oil Wells.—George M. Mowbray, Titusville, Pa.:

First, I claim in ejectors for elevating liquids and other substances from wells, the combination and arrangement of the following specified parts:—first, a pipe through which to force air down into a well. Second, a surface at the bottom of such pipe to reverse the air so forced down, and give it an upward motion; and, third, the combination and arrangement of the plurality of pipes and passages, whereby to divide and distribute and conduct the air upwards, so that it shall act upon the oil or other liquids, and obstructing substances in its ascent, substantially as described.

Second, I also claim the combination and arrangement of the above mentioned three parts, with an inclosing pipe, into which they are to be placed, and between the inner surface of which and the outer surface of the pipe through which air is to be forced down, the liquid to be elevated is to ascend.

Third I claim a bulb or inverted cup or nozzle, B, of any suitable form, screwed or otherwise attached to or formed upon the blast pipe and provided on its upper surface with a plurality of apertures to deliver the air in attennuated form, substantially as set forth.

Fourth, In combination with the aforesaid pipe closed at bottom, and bulb, B, with a plurality of apertures, I further claim the cup, C, adjustable in the relation to the said bulb, substantially as and for the purposes set forth.

Fifth, In combination with the blast pipe, A, I claim the cup or bulb, B, having upon its upper surface a plurality of perforations slits or tubes, surrounding the said blast pipes, substantially as and for the purposes set forth herein.

46,486.—Harvester.—W. Needham and J. Nelson, Rockford, Ill.:

First, We claim the construction and arrangement of a tubular frame substantially as and for the purpose set forth.

Second, The sockets or clamps as shown in figures 4 5 6 and 9, in combination with the tubular frame for the purposes specified.

Third, The gear frame, K', with the clamp, K, when constructed and combined with the tubular frame as described.

Fourth, The wedge washer, k, with serrated or notched faces in combination with the notched face, l', of the standard, and the notched face, j, in the clamp piece, b', as and for the purpose set forth.

Fifth, The wedge washer, r, in combination with the spring seat, R, and the standard, R', in the manner and for the purpose set forth

Sixth, The clamp levers, H' H', and clamps, h'' h'', in combination with the stirrup, h, for the purpose specified.

Seventh, The levers, M, spring catch, g, rack, N, pulleys, m n, in combination with the rope or chain, l, and adjustable standard, P, for the purpose set forth.

Eighth, We claim in combination with the guard bar, E, provided with the wood center piece, F, attaching the guards as and for the purpose set forth.

Ninth, We claim the combination of the adjustable dividing runner, J, the socket, F', and sleeve, I, when constructed and operating conjointly as and for the purpose set forth.

46,487.—Shirt Bosom.—John Neil, Clinton, Mass.:

I claim as a new article of manufacture the woolen shirt bosom herein before described, woven in single pattern, cut in the center and jointed at the edges all as specified.

[The object of this invention is to give an ornamental character and an elegant appearance to bosoms of woolen shirts, and it consists in making a woven ornamented shirt bosom of woolen material or its equivalent, so that the woven shirt shall have an elegant and tasteful appearance in that part exposed to view whilst the ornamental part shall have also substantially the same qualities as the rest of the shirt, or of its body, whether that be woven, knitted or felted.]

46,488.—Harvester.—Frederick Nishwitz, Brooklyn, N. Y.:

I claim, first, The combination of the stationary toothed plate, D, pinions, F F, attached to the ends of an arm, E, firmly keyed on the axle, C, with the pinion, G, on the collar, H, placed loosely on the axle and the lever wheel, I, also placed loosely on the axle and connected with the collar, H, all arranged to operate substantially as and for the purpose set forth.

Second, The lever, M', applied to the main frame, A, and in relation with the draught pole, N*, as shown, and connected to the finger bar, O, by a chain, f, all arranged to operate substantially as and for the purpose set forth.

Third, Connecting the finger bar, O, with the main frame, A, by means of a joint composed of the semi-circular recesses, g g, in the pendants, P P, and the semicircular projections, h h, on the sides of the finger bar, O, substantially as described.

Fourth, The shoe, S, arranged and applied to the main frame, A, relatively with the pitman, N, and finger bar, O, to operate substantially as and for the purpose specified.

46,489.—Harness Saddle Tree.—Oliver B. North, New Haven, Conn.:

I claim, first, A metallic saddle tree for harness, composed of the jockeys, cantel and seat, cast in separate pieces, and united together substantially in the manner and for the purpose described.

I also claim casting a stud upon the underside of the seat for the purpose of uniting said seat to the cantel without passing rivets or screws through, which interfere with and mar the plating or japanning as herein described.

I also claim uniting the check hook to the tree by passing the shank of the hook under the bow of the jockeys, and above the frame, and uniting it by the stud or pin, f, and the screw and nut, g b, or their equivalent devices substantially as herein described and represented

46,490.—Projectile.—Thomas G. Orwig, New York City:

I claim, first, The telescopic tubes, g g, adapted to slide and rotate one within another, in the described combination with the ball, A, stem, f, and wings, h h, all arranged and operating in the manner and for the purposes set forth.

Second, The combination of the perforated cap, B, with the winged telescope stem, E, soft metal ring, C, projectile, A, and cartridge bag, D, constructed and operating substantially as and for the purpose described.

46,491.—Heating Carving Table.—Samuel Patrick, Galesburg, Ill.:

First, I claim a carving table which is provided with a series of pans of varying depths that communicate with each other and also with a boiler substantially as described.

Second, Distributing water of different temperatures through a series of pans by producing a circulation, substantially as herein described.

46,492.—Amalgamator.—C. C. Peck, Black Hawk, Colorado Ter.:

I claim, first, the pan, B, constructed in the form and style shown and described.

Second, A series of pans arranged to operate in the manner and for the purpose set forth.

Third, The spider, m, provided with the bearing, n, and arm, b, substantially as shown and described.

Fourth, The suspended platform, A, arranged to vibrate vertically and longitudinally as and for the purpose set forth.

Fifth, I claim so arranging an amalgamator pan as to give to it the three-fold motion substantially as and for the purpose set forth.

46,493.—Stock Feeder.—Thomas W. Pierce, Richfield, Minn.:

I claim the shaft, F, mounted within the chest, A, in the manner described and provided with cups which by the rotation of the shaft are filled and discharged, substantially as and for the purpose set forth.

Second, I claim the spring, L, and knob, M, in combination with the notch or recess, N, for holding the shaft, F, against rotation when the feeding operation is suspended.

46,494.—Eye Water.—Mary Pike, Cornish, N. H.:

I claim an eye water or lotion, composed of the sulphate of zinc, and chloride of sodium mixed together and dissolved in water about in the proportion herein set forth.

[This invention consists in a mixture of sulphate of zinc, (white vitriol,) and chloride of sodium (rock salt), dissolved in water.]

46,495.—Roofing Composition.—Wm. L. Potter, Clifton Park, N. Y.:

I claim the use of pulverized slate rock for roofing, covering the sides of buildings, boat decks, etc., as set forth and described.

46,496.—Universal Timepiece.—W. B. Purdy, Huntingdon, Penn.:

I claim the application of two or more sets of hands, a^s a'^s b^s b'^s, and so forth, secured to a common center, g, and operating in combination with two or more concentric dials, a b, etc., substantially as and for the purpose set forth.

[This invention consists in the application of two or more sets of hands working on the same center in combination with a corresponding number of concentric dials in such a manner that by the several sets of hands working on several dials the time of two or more places of different longitude can be indicated simultaneously and each set of hands can be readily set to indicate the time of any place on the globe independent of the remaining set or sets.]

46,497.—Skates.—Washburn Race, Lockport, N. Y.:

I claim the combination of the heel screw, e, bearing, a, and nut, f, with the bed, A, and runner, B, substantially as and for the purposes herein described.

46,498.—Bag Holder.—Robert Ramsey, New Wilmington, Penn.:

I claim forming the expanding spring, A2, in one piece of metal with the spreaders, A A', substantially as and for the purpose set forth.

Second, I claim the screw bolt, C, and nut, E, employed in combination with the spreaders, A A', and hooks, f f, in the manner and for the object herein before stated.

46,499.—Stove Drum.—Thomas Roberts, Shelby, Ohio.:

I claim the cone end chambers or sections, E, and, E', annular chamber, D, and the lever, F, in combination with the tubes or pipes, m, and n, damper, B', and drum when arranged and operating conjointly, substantially as and for the purposes set forth.

46,500.—Heat Radiator.—Herman Rugee, Milwaukee, Wis.:

I claim the adjustable segment wings forming an inverted cone in combination with the crank, links or rods for adjusting the wings, substantially as shown and described.

46,501.—Machine for Holding Hubs while being Bored.—Peter Schutler, Chicago, Ill.:

First, I claim the application of a screw ring, D, which is provided with clamps, c c c, to a holder, C, which is applied to a rotating shaft, B, substantially as described.

46,502.—Harvester.—Jacob Leibel, Manlius, Ill.:

I claim, first, the centrally arranged receiver, o, constructed as described in combination with the two endless aprons revolving towards the center of the machine, and depositing the grain in said receiver, substantially as and for the purposes specified and shown.

Second, The platform, Q, provided with the space, l, when arranged in relation to the main frame and endless apron substantially as and for the purposes specified.

Third, Providing a harvesting machine with the raker's stand, P, and the builder's stands, R, and S, when arranged on the main frame of the machine near the center thereof, substantially as and for the purposes herein described.

46,503.—Rotary Photographic plate Holder.—Charles H. Shute, Edgartown, Mass.:

I claim the combination of the photographic dark slide, A, having an orifice, B, and slide, C, with the rotating box carrying the plate and pierced in its face with a series of openings to correspond with the opening, B, as they are alternately exposed to it, the said box being rotated by a lever, by means of a pin working into a ratchet on the back of the lid, G, the circle of the ratchet wheel being divided to correspond with the orifices in the face of the rotating box.

[The object of this invention is to facilitate the taking of several different pictures upon one prepared or neutralized plate. By a very ingenious arrangement of parts the plate is made to rotate so as to bring successive portions before the lens. The invention is particularly applicable to ferrotypes.]

46,504.—Rivets.—John W. Smith, Boston, Mass.:

I claim a rivet constructed with a recess in its end, substantially as and for the purpose herein specified.

46,505.—Tobacco Pipe Stem.—Thomas Smith and Henry J. Brown, Detroit, Mich.:

I claim the combination of the stem, B B, chamber, c c, and tubes, D E, and the cap, F, all constructed and operating substantially as and for the purpose set forth.

46,506.—Construction of Ordnance.—Charles W. Stafford, Old Saybrook, Conn.:

First, I claim in combination with the cast main body, A, of a piece of ordnance, two or more bands (trunnion and reinforce) when secured and strengthened with longitudinally projecting tongue, r, and corresponding grooves, in the manner as herein represented.

Second, I claim the combination of the trunnion band, U, adapted to slip on over the breech, the flange, u, projecting inward from the said trunnion band, the shoulder, a, preventing forward displacement of the trunnion band, and one or more reinforce bands, R, securing it against backward displacement, substantially as herein described.

46,507.—Flexible Tubing for Illuminating Gas.—Wm. B. S. Taylor, New York City:

I claim the use and application of glue or glue composition in the tubing, substantially as described, for the purpose of making the flexible tubing gas tight, whether of cloth or rubber or other gum.

46,508.—Machine for Cutting Barrel Heads.—C. R. Tompkins, Rochester, N. Y.:

I claim, first, The combination and relative arrangement of the rock shaft, P, and lever, K, with the upper and lower boxes, f and f', of the adjustable feed roller, d, substantially in the manner shown and for the purpose of producing a parallel adjustment of the said roller.

Second, In combination with the adjustable pawl arm, y, and ratchet, a, the crank, J, and slotted connecting rod, R, substantially in the manner shown, and for the purpose of producing the intermittent feed as set forth.

46,509.—Coils for Steam Heating Apparatus.—John Trageser, New York City:

I claim, first, The arrangement of the pipes, f i and k, whereby the axial pipe, k, is allowed to expand or contract without injury to the joints as set forth.

Second, I claim the T pipes, d and l, in combination with the coil, p, and couplings, whereby said coil can be twined up as specified.

Third, I claim the conical ground couplings, applied substantially as specified to the coils of steam heating and boiling apparatus, so that said coils will be kept steam tight at the joints and motion allowed for turning said coils up as set forth.

46,510.—Curry Brush or Card.—John Voak, Penn Yan, N. Y.:

I claim the frame, A, handle, a, shoulder rest, a', and gearing C B, in combination with the brush E, and receptacle, F, the several parts being constructed, arranged, and operated as set forth.

46,511.—Microscope.—William Wales, Fort Lee, N. J.:

I claim the application of two or more back lenses or correctors in combination with the same microscope object glass constructed and operating substantially as and for the purpose set forth.

[This invention consists in the application of two or more back lenses or correctors in combination with the same microscope object glass, in such a manner that the angle of aperture left for natural reflected light is equal to that for oblique or angular light in contradistinction to the use of two or more front lenses which have to be changed and shifted to be adapted to central and oblique light.

46,512.—Retainer for Window Sash.—John H. Weeks, Philadelphia, Pa.:

I claim the combination of the lever, E, its knob, G, and arm or projection, e, the spring, k, bolt, D, and its lip, c, the whole being constructed, applied to a sash, and arranged for joint action as and for the purpose herein set forth.

46,513.—Device for Equalizing the Delivery of Thread from Shuttles and Spools of Sewing Machines.—William Weitling, New York City:

I claim the application to the spool or bobbin in a shuttle or other part of a sewing machine of a thread leader having a motion in the arc of a circle, and constructed and operated substantially in the manner and for the purpose described.

46,514.—Apparatus for Softening the Gum of Adhesive Labels.—Benjamin Wilder, North Scituate, Mass.:

I claim as my invention the apparatus, substantially as and for the purpose described.

46,515.—Apparatus for Distributing Fertilizers.—J. M. Wiltsie, Pittsford, N. Y.:

I claim, first, The swinging self-locking bail or handle, B, applied and operated in the manner and for the purpose specified.

Second, The application of the bars, C, in distributors for lime and other fine fertilizers, to be used by hand, as shown and for the purposes set forth.

Third, Arranging the register plate, D, within the case as shown, and for the purposes described.

46,516.—Operating Ordnance on Gun Boats, &c.—William Louis Winans, Baltimore, Md.:

I claim mounting the carriage of a gun on a platform which is connected with a plunger to be elevated by the admission of steam to the cylinder, substantially as described, in combination with the connection of the said platform with other plungers fitted to cylinders to regulate the descent of the platform and gun by the flow of water or other fluid, substantially as described and for the purpose specified.

I also claim making the plungers for regulating the descent of the platform and gun with a cavity in the lower end thereof to retain air, substantially as described, to act as a spring cushion to receive sudden and violent concussions, as set forth.

I also claim in combination with the mounting of a gun on a platform to be raised and depressed, the employment of a chassis connected with the platform and interposed between it and the carriage, and provided with wedges or the equivalent thereof to vary the inclination of the chassis, substantially as and for the purpose specified.

I also claim connecting the upper part of the carriage in which the gun is mounted with the lower part thereof by means of a a swivel in combination with the chasis connected with the movable platform by which the gun is raised to be fired, and let down to be reloaded, substantially as and for the purpose described, whereby the gun can be turned to take any range desired, notwithstanding the platform by reason of its connections can not be turned.

And I also claim in combination with the platform for raising and letting down the gun, as described, the employment of sliding hatchways so connected with the platform as to be operated by the motions of the platform, substantially as and for the purpose specified.

46,517.—Well Borers.—George L. Witsil and Edward Burke, Philadelphia, Pa.:

We claim, first, The employment of two or more augers in combination with a central upward discharging drill, substantially as described.

Second, connecting the augers, A A a', to the drill collar, N, in such manner that the augers can be rotated independently of the drill, or can be made to rotate the drill, at pleasure, substantially as described.

Third, The center drill point, C, plowing cutters, B B b, collar, N, and the right and left twisted elevators, A A a', combined and operated substantially as herein described.

Fourth, Feeding the augers down to their work by means of right and left screws, p p' p p, applied and operating substantially as described.

46,518.—Preparing Barrels to Hold Oil, Petroleum, &c.—Henry Wurtz, New York City:

I claim, first, The introduction into the pores of wood and other porous materials, when used as materials for barrels or other vessels for holding oils, of aqueous solutions of deliquescent salts, as above set forth.

Second, The subsequent superficial application to such substances or agents which convert the deliquescent salts into insoluble compounds, as above set forth.

Third, The method of preparing barrels and other vessels composed of wooden staves bound by hoops for holding oils by filling them with deliquescent saline solutions and tightening the hoops as the wood shrinks by absorption of the liquid, as above set forth.

Fourth, The prevention of the corrosion of iron hoops, nails and other iron fastenings of barrels and other vessels for holding oils when impregnated with solutions of deliquescent salts by adding to such solutions sucrate of lime, as above set forth.

Fifth, The application to the internal surface and between the joints of barrels and other vessels for holding oils of a paste composed of deliquescent saline solution combined with some substance of a gelatinous, glutinous, mucilaginous, farinaceous, gummy or starchy nature as above set forth.

46,519.—Ticket Holder.—Varnum G. Arnold, Boston, Mass., assignor to himself and Chas. G. Bird, Roxbury, Mass.:

I claim a holder or case for passage tickets, constructed with a delivery duct, in combination with an aperature, A, in the side of the same, for delivering the tickets one by one by the action of the thumb, substantially as herein described, for the purpose specified.

46,520.—Roasting and Desulphurizing Ore.—Hezekiah Bradford, New York City, assignor to Horatio Bogart. Ante-dated Feb. 16, 1865:

First, I claim the process, substantially as herein described, of treating metallic ores in a finely divided or pulverized state, in a chamber with jets of superheated steam, or heated air, or both, jointly forced through the charge, substantially as and for the purposes specified.

Second, I claim retaining the fine particles of ore that pass off from the ore chamber with the steam air or gases, by passing the same into or through water, substantially as set forth.

Third, I claim discharging the finely-pulverized ore from the ore chamber through a pipe into a vessel or reservoir of water by the pressure of the air gas or steam, substantially as set forth.

46,521.—Milling Machine.—Joseph R. Brown (assignor to Brown & Sharpe), Providence, R. I.:

First, I claim the combination of the elevating knee, H, the sliding plate, E, the swivel plate, L, and sliding carriage, G, with the revolving cutter head, constructed and arranged to operate substantially as described.

Second, The arrangement of the center spindle, b, or its equivalent, with the devices which actuate and govern the movements of the same, in combination with the sliding carriage, G, and the devices by which it is operated, so that the two mechanisms may operate either separately or conjointly, substantially in the manner described.

Third, I claim the arrangement within the center head, F, of the swinging block, R, or its equivalent, and the revolving spindle, b, with the devices which operate the same, substantially as described, for the purpose specified.

46,522.—Machine for Cutting Pasteboard for Boxes.—Elizur E. Clarke (assignor to Franklin N. Clarke), New Haven, Conn.:

I claim the method of holding and adjusting the cutter without the employment of the cutter stock, by combining with the cutter bar, having two side grooves and one tap groove, a cutter holder slotted or grooved vertically for adjustment on a binding bolt, and horizontally-sliding cross or T-stud, together with the horizontally-sliding form and collar screw, for the vertical adjustment of the cutters, substantially as set forth.

I also claim the attachment to the cutter bar of the parallel or horizontal beam or cap, set at a distance apart, to admit of the groove of the screw nut, in combination with grooves in both the said cutter bar and beam, to admit of the collar of the screw nut, the whole being arranged for operation substantially as set forth.

I also claim the mode herein described of locating and holding a rule or scale in its proper relation with respect to the cutter, by combining with the cutter bar and uprights, brackets or the equivalents thereof, in the manner substantially as hereinbefore shown and described.

46,523.—Grain Drill.—J. W. H. Doubler (assignor to himself and John E. Wynne), Warren, Ill. Ante-dated Feb. 6, 1865:

First, I claim the hollow drills, F G, constructed, arranged and operating as and for the purposes herein specified and shown.

Second, I claim the combination of the drills aforesaid with the adjustable bar, H, and lever, g, arranged and operating substantially as and for the purposes shown and described.

Third, In combination with the above, I claim the parallel bar, L, and the chains, p, arranged and operating as and for the purposes set forth.

Fourth, I claim the curved arms, J, provided with the slot, j, and set screw, k, arranged as and for the purposes specified.

Fifth, I claim providing the spiral distribution, D, with the several bearings, f f', so as to divide the same into separate compartments, substantially as and for the purposes herein delineated and set forth.

46,524.—Carriage Wheels.—Joseph Goodman, Blackfriar's Road, Eng., assignor to Charles P. Button, New York City:

I claim the disk, I, with conical central bars, J, in combination with the grooved disk, L, and its central openings, a, and with the spokes, C, and felly or tire, D, constructed and operating substantially as herein described, so that by screwing the two plates together the spokes are forced out to a uniform distance from the center and securely clamped.

[This invention consists in the employment or use of a disk, with a conical central bore, in combination with a grooved plate and its central opening, and with the spokes and felly or tire of a wheel, in such a manner that by screwing the disk and plate together the spokes are forced out to a uniform distance from the center, and securely clamped, and the felly or tire is equally strained throughout the whole circumference and brought in the position of a true circle.]

46,525.—Mosaic Toy Block.—Thos. Geo. Harold (assignor to himself and Nelson Stafford), Brooklyn, N. Y.:

I claim a series of square or cubical blocks, whose surfaces are colored in triangular forms, as and for the purposes specified.

46,526.—Tuyer.—John R. Harrington (assignor to Agnes V. Harrington), Brooklyn, N. Y.:

In combination with the box, A, provided with the projection, a, and tube, a3, I claim the back, B, provided with the tube, b3, when the same shall be combined and operated in the manner and for the purpose specified.

46,527.—Gas-heater or Blow-pipe for Heating Soldering Irons.—Edwin A. Leland (assignor to Radcliffe B. Lockwood), New York City:

I claim the new article of manufacture, consisting of a gas furnace or blow-pipe, constructed substantially in the manner described, for the purpose of heating soldering tools, and for other similar purposes.

46,528.—Coat and Hat Rack.—Samuel Macferran and Stephen Ustick (assignors to Samuel Macferran), Philadelphia, Pa.:

We claim the combination of the segmental or elliptical bar, A, the hook, B, the bracket, C, and hook, B', substantially in the manner described and for the purpose above set forth.

46,529.—Spring Horse.—Henry F. Metzler (assignor to himself and Thos. G. Cowperthwaite,) New York City:

I claim the manner in which the standards are arranged, combined, operated and adjusted relatively to their several parts and to the horse baby-tender or chair, whereby the several motions as described are obtained.

46,530.—Roving Frame.—Thomas Mayor, Pawtucket, R. I., assignor to George Chatterton, Providence, R. I.:

I claim the construction and mode of arranging the bolster with the spindle and the transverse rail or its equivalent, substantially as described for the purpose specified.

46,531.—Lock.—Lyman F. Munger, Rochester, N. Y., assignor to himself and Walter K. Marvin, New York City:

I claim, first, The combination in a lock case of frictional key tumblers, bolt and fence tumbler, together with the follower or lever to actuate the same under the arrangement herein described, so that both the said key tumblers and bolt when actuated shall move in planes parallel to each other, substantially as set forth.

Second, In combination with horizontally sliding key tumblers and double-gated bolt, I claim the double-acting fence tumbler operating as described, so as to lock the bolt whether shot out or withdrawn, substantially as set forth.

Third, The method herein described of operating the key tumblers by forming a cam groove in the fence tumbler, in combination with a pin passing through and projecting from the said key tumblers, the whole being arranged for operation substantially as set forth.

46,532.—Breech-loading Fire-arms.—Joseph Rider, Newark, Ohio, assignor to himself and E. Remington & Sons, Ilion, N. Y.:

I claim, first, Combining with a hammer that is hung upon the side of the arm, and moves at right angles to the bore of the gun, a nose or projection, which, shooting into a mortise through the barrel, forms a breech piece, substantially as and for the purpose described.

I also claim combining with such a hammer, or the projection thereon, a pivoted trigger or lever, for striking or impinging upon the cartridge, and thus explode it simultaneously with the closing of the arm, substantially as herein described.

46,533.—Steam Boiler.—E. B. Sintzenich (assignor to himself and Joseph Hall), Rochester, N. Y.:

I claim, first, The arrangement of the water flues centrally within the horizontal fire or combustion flues of marine boilers, as shown, and for the purposes set forth.

Second, The combination and relative arrangement of the manhole, D, with the horizontal return fire or combustion flues and their water flues, the latter having their front ends connected with the water space surrounding the combustion chamber, I, substantially as shown and described, and for the purpose herein set forth.

46,534.—Shade-holder for Lamps.—Cornelius St. John (assignor to Roscoe G. Turner, assignor to Charles C. Beers), Boston, Mass.:

I claim the spring support, C, in combination with a socket, D, operating substantially in the manner and for the purpose set forth.

45,535.—Means for Applying Heat and Cold in the Treatment of Diseases.—John Chapman, M. D., Somerset street, Putnam square. London, Eng.:

I claim the manner of applying heat and cold, solids or fluids, by means of "spine bags," composed of india-rubber or other waterproof flexible material, when said bags are divided into two or more cells or compartments, whether such cells or compartments are formed by the pressure of clamps upon the exterior or by the use of one or more interior partitions.

I also claim spine bags for making hot applications, when such bags are composed of two or more tubular compartments.

46,536.—Furnace for Burning Gas.—Carl Schinz, Offenburg, Grand Duchy of Baden:

I claim, first, The employment or use of the gas splitter, G, with two or more tuyeres, k, in combination with the generator, C, air inlet, i, and combustion flue, o, or its equivalent, constructed and operating in the manner and for the purpose substantially as herein specified.

Second, The employment or use of two or more air tuyeres, i, in combination with the channel, F, rising from the generator, C, and with the combustion flue, o, or its equivalent, constructed and operating substantially as and for the purpose set forth.

Third, The employment or use of two or more combustion flues, o, proportioned according to the rules above specified, and arranged in combination with the gas channel, F, and air channel or channels, i, substantially in the manner and for the purpose set forth.

Fourth, The application of a window, J, in front, and one or more loopholes, q, in the rear of the combustion flues, o, substantially as and for the purpose specified.

[The object of gas-burning furnaces and stoves is to obtain the largest possible useful effect of the fuel. This purpose is effected because this system offers the means, 1, to produce the dry products of distillation obtained from the fuel more regularly than the direct mode of firing; 2, to effect a complete combustion of all the combustible materials; 3, to commingle the oxygen of the atmospheric air and the combustible materials in the proper proportion, and consequently neither a surplus of combustible gases nor of air exists, and the maximum effect of initial temperature resulting from the products of combustion is obtained.]

RE-ISSUES.

1,875.—Automatic Grain Binder.—Robert D. Brown, Covington, Ind. Patented April 7, 1863:

First, In combination with a cradle, B of any suitable construction, I claim the arms, C C', attached to shafts, c c, geared together by wheels, c', and rotated at proper intervals by a cogged segment, c3, to elevate the arms, C C', and carry the band around the compressed gavel.

Second, The combination of the cam wheel, c2, with the arms, C C', for securing the band in the jaws, c4.

Third, In combination with the arms, C C', constructed and operating substantially as herein described, I claim the employment or use of two pairs of griping or twisting jaws, D D, attached by separate pivots, d d, to a common journal, D', and operating substantially as and for the purpose set forth.

Fourth, Driving the jaws, D, by the shaft, E, working within the hollow journal, D', in the manner explained, to compress the said jaws with force corresponding with that required to rotate them.

Fifth, The combination of the spring stop, k2, cam i2, and wheels, I and K, when the said parts are constructed, arranged and operated in the manner and for the purposes herein specified.

Sixth, The tucking hand, f, advanced and rotated substantially as

described for the purpose of tucking the twisted ends under the band.

Seventh, Holding the band against the pressure of the tucking band by means of the claw, f, or its equivalent, substantially as described.

Eighth, The combination and arrangement of the shafts, F F', yokes, f2, pinions, f3 f4, guides, H, and segment racks, h, to impart the required motion to the tucker, f, and claw, f1, substantially as set forth.

Ninth, The arm, G, provided with a cogged segment, g', and employed to advance the shafts, F F', intermittently, in the manner and for the purposes explained.

Tenth, The segment cog wheel, I i i', constructed as described, in combination with the twisting jaws, D, and tucker, f, or their equivalents.

Eleventh, The arm, L, or its described equivalent, for casting the finished sheaf, substantially as explained, when used in the described combination with the pivoted table, N or N2, or other suitable receptacle for carrying the sheaves and depositing them in heaps.

Twelfth, The curtain, P or P2, operated by the falling and rising of the table, N or N2, in manner substantially as and for the purposes set forth.

Thirteenth, The mode of combining the worm, s2, and slotted disk, O, or any substantially equivalent devices, for counting the number of sheaves to be deposited in each heap, with an automatic binding machine, substantially as herein described.

Fourteenth, The combination of the sheaf-holder, B B', or equivalent device, with rotating griping jaws for twisting the band, and the tucking hand and holder, as described.

1,876.—Raking Attachment to Harvester.—Robert D. Brown, Covington, Ind. Patented April 7, 1863:

I claim, first, The continuously revolving rake, B, carried forward over the platform and back beneath the same by means of driving chains, bolts, or their equivalent, and elevated to its working position during its forward motion and retracted in passing beneath the platform by means of the crank and D, or its equivalent, working in a slot for the purposes specified.

Second, The intermittent cradle, F f, operated as described, in combination with the continuously revolving rake, B, for the purposes set forth.

1,877.—Steam Engine.—Fred'k P. Dimpfel, New York City. Patented July 1. 1851.

Claim, first, The means herein described for connecting the steam piston of a steam engine with the crank thereof, said means consisting of a piston rod, fixed crosshead, side bars, forked connecting rod and belts, or the equivalents thereof, the several devices being arranged and operating substantially as herein set forth, in such manner that the crosspiece of the connecting rod which is placed transversely to the crank shaft shall be on opposite sides of the axial line of said shaft at opposite extremities of the stroke of the piston.

Second, The forming of the eduction and induction chambers in cylinder heads of steam engines, and furnishing them respectively with supply and exhaust valves, substantially in the manner and for the purposes described.

Third, The forming of two steam chambers in one or both heads of a steam engine cylinder in combination with induction and eduction steam pipes, and with puppet or other valves, in such manner that a large portion of the steam shall be saved which is lost or wasted in the nozzles or steam ways of engines as ordinarily constructed, substantially as described.

Fourth, The removable chambered cylinder head, in combination with the extension chambers, u u, and steam pipes, r r, connected to the latter, substantially as and for the purposes described.

Fifth, The manner, substantially as described, of applying the induction and eduction valves with their respective chambers to steam cylinders, for the purpose set forth.

1,878.—Condenser.—Wm. A. Lighthall, New York City. Patented Dec. 17, 1861:

I claim securing the packing rings, C, or their equivalents or substitutes, as herein described, in the apertures, B, in the head sheet, A, around the ends of the tubes, D, without the use of a follower or other analogous mechanical device or arrangement, as herein set forth.

1,879.—Portable Water Condenser.—Wm. A. Lighthall, New York City. Patented July 29, 1862:

I claim, first, The combination of the tank, N, filter, B, condenser, F, and heater, G, when arranged in relation to each other in the manner and for the purposes herein set forth.

Second, The construction of the case of the condenser, F, with spaces above and below the series of tubes, K, as and for the purposes set forth.

1,880.—Naval Ram for the destruction of the Enemy's Ships.—Charles Perley, New York City. Patented Feb. 24, 1863:

First, In combination with a horn or ram capable of being projected from or drawn into a vessel below the water line, I claim a valve gate or gates to close the orifice when the same is removed. as specified.

Second, I claim a cutting edge provided at the end of a horn or ram to prevent the same glancing off when striking diagonally against an opposing vessel, as set forth.

Third, In combination with a movable horn or ram, I claim a weight or mass of material employed behind said horn or ram, but separate from the vessel itself, and acting to drive the horn into the vessel to be destroyed, substantially as set forth.

1,881.—Machine for Cutting Files.—Milton D. Whipple (assignor by mesne assignments to the Whipple File Manufacturing Company), Cambridge, Mass. Patented Oct. 7, 1856:

I claim feeding the blank forward and rotating it upon its axis as the cutting proceeds, when it is operated upon by the vibrating cutters in the manner substantially as herein set forth.

I also claim supporting one end of the blank in a socket that is free to move with it and to accommodate itself to blanks of various lengths, substantially as set forth.

I also claim, in combination with a round blank that is rotated for the purposes described, operating upon the blank immediately beyond its point of support, in the manner and for the purpose substantially as herein described.

I also claim the method herein described of operating the cutters by means of the wipers, b, and the springs, A2 and Z, whereby the force of the blow is diminished as the size of the blank decreases, as set forth.

I also claim forming the cutters of circular disks, or of portions thereof, in the manner and for the purpose substantially as herein set forth.

DESIGNS.

2,032.—Agricultural Furnace.—Merritt Peckham, Utica, N. Y..

2,033.—Spoon and Fork Handle.—Julius L. D. Sullivan, Somerville, Mass.:

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MESSRS. MUNN & CO.:—I take pleasure in stating that, while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE CAME THROUGH YOUR HANDS. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the office, a marked degree of promptness, skill, and fidelity to the interests of your employers. Yours very truly,

CHAS. MASON.

Judge Mason was succeeded by that eminent patriot and statesman, Hon. Joseph Holt, whose administration of the Patent Office was so distinguished that, upon the death of Gov. Brown, he was appointed to the office of Postmaster-General of the United States. Soon after entering upon his new duties, in March, 1859, he addressed to us the following very gratifying letter.

MESSRS. MUNN & CO.:—It affords me much pleasure to bear testimony to the able and efficient manner in which you discharged your duties as Solicitors of Patents, while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and I doubt not justly deserved) the reputation of energy, marked ability, and uncompromising fidelity in performing your professional engagements.

Very respectfully, your obedient servant,

J. HOLT.

Hon. Wm. D. Bishop, late Member of Congress from Connecticut, succeeded Mr. Holt as Commissioner of Patents. Upon resigning the office he wrote to us as follows:

MESSRS. MUNN & CO.:—It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your agency; and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully, your obedient servant,

WM. D BISHOP.

THE EXAMINATION OF INVENTIONS.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a written reply, corresponding with the facts, is promptly sent, free of charge. Address MUNN & CO., No. 37 Park Row, New York.

As an evidence of the confidence reposed in their Agency by inventors throughout the country, Messrs. MUNN & CO. would state that they have acted as agents for more than TWENTY THOUSAND inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of inventors and patentees, at home and abroad. Thousands of inventors for whom they have taken out patents have addressed to them most flattering testimonials for the services rendered them; and the wealth which has inured to the individuals whose patents were secured through this office, and afterwards illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! Messrs. MUNN & CO. would state that they never had a more efficient corps of Draughtsmen and Specification Writers than those employed at present in their extensive offices, and that they are prepared to attend to patent business of all kinds in the quickest time and on the most liberal terms.

PRELIMINARY EXAMINATIONS AT THE PATENT OFFICE.

The service which Messrs. MUNN & CO. render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there; but is an opinion based upon what knowledge they may acquire of a similar invention from the records in their Home Office. But for a fee of $5, accompanied with a model, or drawing and description, they have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a patent, &c., made up and mailed to the inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through the Branch Office of Messrs. MUNN & CO., corner of F and Seventh streets, Washington, by experienced and competent persons. Many thousands of such examinations have been made through this office, and it is a very wise course for every inventor to pursue. Address MUNN & CO., No 37 Park Row, New York.

THE VALIDITY OF PATENTS.

Persons who are about purchasing patent property, or patentees who are about erecting extensive works for manufacturing under their patents, should have their claims examined carefully by competent attorneys, to see if they are not likely to infringe some existing patent, before making large investments. Written opinions on the validity of patents, after careful examination into the facts, can be had for a reasonable remuneration. The price for such services is always settled upon in advance, after knowing the nature of the invention and being informed of the points on which an opinion is solicited. For further particulars address MUNN & CO., No. 37 Park Row, New York.

The Patent Laws, enacted by Congress on the 2d of March, 1861 are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The law abolishes discrimination in fees required of foreigners, excepting natives of such countries as discriminate against citizens of the United States—thus allowing Austrian, French, Belgian, English, Russian, Spanish and all other foreigners, except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms. Foreigners cannot secure their inventions by filing a caveat; to citizens only is this privilege accorded.

CAVEATS.

Persons desiring to file a caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. The Government fee for a caveat is $10. A pamphlet of advice regarding applications for patents and caveats is furnished gratis, on application by mail. Address MUNN & CO., No. 37 Park Row, New York.

REJECTED APPLICATIONS.

Messrs. MUNN & CO. are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of their Washington Agency to the Patent Office affords them rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Their success in the prosecution of rejected cases has been very great. The principal portion of their charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted, are invited to correspond with MUNN & CO., on the subject, giving a brief history of the case, inclosing the official letters, &c.

FOREIGN PATTENS.

Messrs. MUNN & CO., are very extensively engaged in the preparation and securing of patents in the various European countries. For the transaction of this business they have offices at Nos. 66 Chancery lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. They thing they can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through their agency.

Inventors will do well to bear in mind that the English law does no limit the issue of patents to inventors. Any one can take out a patent there.

Circulars of information concerning the proper course to be pursued in obtaining patents in foreign countries through MUNN & CO'S Agency, the requirements of different Government Patent Offices, &c. may be had, gratis, upon application at the principal office, No. 37 Park Row, New York, or any of the branch offices.

HOW TO MAKE AN APPLICATION FOR A PATENT.

Every applicant for a patent must furnish a model of his invention if susceptible of one; or, if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them, and sent, with the Government fees, by express. The express charge should be pre-paid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by a draft on New York, payable to the order of Messrs. MUNN & CO. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park Row New York.

Patents are now granted for SEVENTEEN years, and the Government fee required on filing an application for a patent is $15. Other changes in the fees are also made as follows:—

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

SEARCHES OF THE RECORDS.

Having access to all the official records at Washington, pertaining to the sale and transfer of patents, MESSRS. MUNN & CO., are at all times ready to make examinations as to titles, ownership, or assignments of patents. Fees moderate.

INVITATION TO INVENTORS.

Inventors who come to New York should not fail to pay a visit to the extensive offices of MUNN & CO. They will find a large collection of models (several hundred) of various inventions, which will afford them much interest. The whole establishment is one of great interest to inventors, and is undoubtedly the most spacious and best arranged in the world.

MUNN & CO. wish it to be distinctly understood that they do not speculate or traffic in patents, under any circumstances; but that they devote their whole time and energies to the interests of their clients.

COPIES OF PATENT CLAIMS.

MESSRS. MUNN & CO., having access to all the patents granted since the rebuilding of the Patent Office, after the fire of 1836, can furnish the claims of any patent granted since that date, for $1.

EXTENSION OF PATENTS.

Many valuable patents are annually expiring which might readily be extended, and if extended, might prove the source of wealth to their fortunate possessors. Messrs. MUNN & CO. are persuaded that very many patents are suffered to expire without any effort at extension, owing to want of proper information on the part of the patentees, their relatives or assigns, as to the law and the mode of procedure in order to obtain a renewed grant. Some of the most valuable grants now existing are *extended patents*. Patentees, or, if deceased, their heirs, may apply for the extension of patents, but should give ninety days' notice of their intention.

Patents may be extended and preliminary advice obtained, by consulting, or writing to, MUNN & CO., No. 37 Park Row, New York.

ASSIGNMENTS OF PATENTS.

The assignment of patents, and agreements between patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park Row, New York.

UNCLAIMED MODELS.

Parties sending models to this office on which they decide not to apply for Letters Patent and which they wish preserved, will please to order them returned as early as possible. We cannot engage to retain models more than one year after their receipt, owing to their vast accumulation, and our lack of storage room. Parties, therefore, who wish to preserve their models should order them returned within one year after sending them to us, to insure their obtaining them. In case an application has been made for a patent the model is in deposit at the Patent office, and cannot be withdrawn.

It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with patent property or inventions to call at our extensive offices, No. 37 Park Row, New York, where any questions regarding the rights of Patentees, will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid) should be addressed to MUNN & CO. No. 37 Park Row, New York.

Notes and Queries

D. T., of Pa.—Your plan for raising sunken vessels, by securing steam boilers to their sides and then pumping the wate out of the boilers, is essentially the same as one in common use with the difference that stout wooden casks are employed instead of iron boilers.

M. W., of N. J.—We know of no treatise on the manufacture of pistols. Booth's, Muspratt's, or any other large work on chemistry, will give you full directions for making fulminating powders. No one should attempt this dangerous operation who is not accustomed to chemical manipulations.

J. M. M., of N. Y.—Inventors frequently prejudice persons disposed to use their machinery by incredible statements. No boiler in existence "will save nine-tenths" of the fuel required to run another boiler of similar capacity.

D. S., of Pa.—It seems to us that the crank motion is beautifully adapted to the steam engine, as with a constant motion of the crank the motion of the piston is slow at the ends and rapid in the middle of the stroke, just as is desired. We should be surprised if any properly-conducted experiment should show other modes of converting rectilinear into rotary motion to be more economical.

G. R., of Mass.—You can obtain asbestus of Julius G. Phole, M. D., analytical chemist, successor to Dr. Chilton, No. 93 Prince street, New York.

G. E. S., of Cal.—The uses of asbestus are very few and the demand small. If that in your locality has a fine, strong fiber you might possibly find a market for it by writing to Schieffelin Brothers, of this city.

T. J. W., of N. Y.—In the perfect combustion of coal one atom of carbon combines with two atoms of oxygen to form carbonic acid, CO_2. The weight of the carbon atom is 6, and of the oxygen 8, so the proportion is 6 pounds of carbon to 16 of oxygen. The weight of 100 cubic inches of air is 31 grains, and the proportion of oxygen is 22 76-100ths per cent. From these data you can make your own calculations.

C. R. W., of Ill.—We should think a caloric engine would answer your purpose if you have no more machinery to drive than what you state.

W. H. F., of Mass.—You inquire whether certain tools in our article under that head are new or old. We can tell better when we know what tools you mean.

C. B. S., of Conn.—All pumps require more or less attention. If any man sells you a machine of any kind and says it requires no attention he makes a rash statement.

D. R. W., of Maine.—We have no faith in recutting files with sulphuric acid. No durability is found in files so treated.

J. H. J., of Ohio.—We have our own opinion in regard to the discoveries claimed for Swedenborg, but we do not introduce discussions into the SCIENTIFIC AMERICAN which are likely to promote sectarian controversy.

W. C. C., of N. Y.—You had better write to the Commissioner of Agriculture, at Washington, for information about tobacco seed.

Money Received

At the Scientific American Office, on account of Patent Office business, from Wednesday, February 15, to Wednesday, Feb. ruary 22, 1865:—

R. R., of N. Y., $15; G. & H., of N. Y., $30; C. W. C., of N. Y., $12; J. A. M., of N. Y., $25; W. H. L., of N. Y., $30; C. F., of N. Y., $12; J. P. B., of N. Y., $25; B. M. S., of N. Y., $25; J. W. C., of N. Y., $12; N. E. B., of N. Y., $25; L. E., of N. Y., $35; W. W., of N. Y., $15; B. & S., of Conn., $50; B. D. S., of Va., $70; F. L., of Ohio, $20; G. Q. P., of N. Y., $30; W. M. S., of N. Y., $15; F. & D., of Mass., $20; W. R. T., of Pa., $20; J. G. V., of Conn., $20; F. & W., of N. Y., $25; J. Z., of N. Y., $70; J. A., of N. H., $20; W. H., of Del., $20; J. H., of N. Y., $20; H. H. E., of Conn., $20; R. A., of Ohio, $20; J. K., of N. Y., $20; J. B., of N. Y., $20; J. C. M., of Ohio, $20; D. F. W., of Ky., $20; J. N. P., of N. Y., $70; J. R., of Ind., $20; H. Z., of N. Y., $20; A. A. M., of N. Y., $20; L. B., of N. Y., $15; W. G. M., of N. Y., $20; E. H., of N. Y., $40; F. M. C. DeV., of N. Y., $22; W. H., of N. Y., $20; G. F. S., of N. Y., $45; A. E., of Ohio, $20; A. B., of Ohio, $20; J. L., of Mass., $20; B. & M., of N. Y., $45; L. C. F., of Ill., $55; H. G. W., of Iowa, $45; J. H., of N. Y., $20; B. & W., of Ind., $40; L. D., of N. Y., $15; J. M. D., of N. Y., $15; A. H., of N. Y., $136; B. O., of N. Y., $15; H. B., of Iowa, $20; D. S., of Mass., $20; M. B. D., of N. Y., $50; L. J. R., of N. Y., $50; B. & B., of N. Y., $15; W. C. H., of N. Y., $22; M. K., of N. J., $22; T. L. L., of R. I., $20; C. & D., of R. I., $22; J. W. B., of N. Y., $15; R. N., of N. Y., $45; W. L. F., of N. Y., $15; A. W. H., of N. Y., $20; J. M. C., of Mass., $35; S. T., of N. Y., $20; J. L. T., of Mass., $20; J. & S., of Conn., $20; W. S. McN., of Conn., $15; J. M. C., of Mass., $2); C. F., of N. Y., $20; F. G. H., of Mass., $15; L. G. F., of N. Y., $15; E. L. C., of N. Y., $40; G. S., of N. Y., $15; L. R. B., of N. J., $15; L. & B., of Ohio, $250; T. S., of Conn., $15; J. M. R., of N. J., $50; W. & C., of N. J., $25; C. C. T., of Me., $30; H. O. C., of Eng., $16; L. R., of N. Y., $25; J. L., of Ohio, $15; J. K., of Iowa, $15; J. M., of Mass., $16; J. C. C., of Conn., $25; H. & R., of Ohio, $16; J. E. M., of Wis., $15; K. & M., of Pa., $10; W. O. B., of N. J., $25; I. W. L., of N. Y., $27; N. H., of N. Y., $15; J. E. Y., of Pa., $16; F. G. J., of N. Y., $200; J. S. G., of Me., $25; J. R. C., of N. Y., $15; J. F., of N. Y., $15; R. B., of N. J., $15; J. L. K., of Pa., $15; J. S., of N. Y., $15; J. H., of N. H., $15; J. S. B., of N. Y., $136; T. L. M., of Ohio, $21; L. H. H., of N. Y., $207; A. W. F., of Vt., $25; P. C. R., of Mass., $15; W. N., of Conn., $10; J. W. A., of Ill., $15; M. R. S., of Ohio, $16; S. & H., of Ind., $16; S. S. D., of Wis., $25; T. B. G., of U. S. N., $50; T. J. B., of Tenn., $20; C. N., of Ill., $25; S. B., of Pa., $10; D. C., of Wis., $25; J. H. T., of Nebraska, $16; T. W. C., of N. H., $16; D. & S., of Pa., $16; J. A., of Wis., $21; J. B., of Ill., $20; H. G. H., of Mass., $10; N. E. B., of N. Y., $25; P & D., of N. Y., $25; C. W. C., of Mass., $16; A. K. F., of La., $75; E. S. H., of Mass, $25; W. C., of Mass., $30; A. H. N., of Mass., $25; G. A. H., of Mass., $16; J. B. K., of N. Y., $15; A. & L., of Pa., $15; W. W., Jr., of Del., $40; C. & R., of N. Y., $25; H. C. S., of Me., $25; J. B., of Pa., $15; G. F. W., of Mass., $40; W. & T., of Vt., $25; C. G., of Mass., $25; J. A. M., of Mass., $40; E. B., Jr., of R. I., $15; C. H., of N. Y., $25; E. W., of Me., $10.

Persons having remitted money to this office will please to examine the above list to see that their initials appear in it, and if they have not received an acknowledgment by mail, and their initials are not to be found in this list, they will please notify us immediately, stating the amount and how it was sent, whether by mail or express.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office, from Wednesday, Feb. 15, to Wednesday, Feb. 22, 1865:—

J. W. N., of Conn., 2 cases; R. R., of N. Y.; G. & H., of N. Y.; C. W. C., of N. Y.; W. H. L., of N. Y.; J. P. B., of N. Y.; B. M. S., of N. Y.; J. W. C., of N. Y.; A. S. L., of N. Y.; N. E. B., of N. Y.; B. & S., of Conn.; B. D. S., of Va.; G. Q. P., of N. Y.; J. Z., of N. Y.; W. G. M., of N. Y.; E. H., of N. Y.; F. M. C. DeV., of N. Y.; A. H., of N. Y., 3 cases; L. J. R., of N. Y.; W. C. H., of N. Y.; S. T., of N. Y.; E. L. C., of N. Y.; D. C., of N. J.; A. K. F., of La.; P. & D., of N. Y.; E. S. H., of Mass.; A. H. N., of Mass.; W. C., of Mass.; T. I. B., of Tenn.; C. N., of Ill.; D. C., of Wis.; D. G. H., of Mass., 2 cases; P. D., of Pa.; L. R., of N. Y.; C. C. T., of Me.; J. S., of N. Y.; W. O. B., of N. J.; J. J. G., of Me.; A. W. F., of Vt.; S. S. D., of Mass.; T. S., of Conn.; J. M. R., of N. J.; C. & R., of N. Y.; H. C. S., of Me.; C. G., of Mass.; W. & T., of Vt.; G. F. W., of Mass.; C. B., of Mass.; O. F. & M., of France; W. & C., of N. J., $15.

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UPHOLSTERERS AND MATTRESS MANUFACTURERS will find it to their interest to call and see a Model of my new Patent Spring Bed, as I am now offering to sell State Rights. Will remain two weeks at Lovejoy's Hotel, Room No. 62. 10 2* G. W. MITCHELL.

BRICK MACHINE.—LAFLER'S NEW BRICK MACHINE, patented January 6, 1863, has been in successful operation three years. The superiority of this machine consists in making two kinds of Brick—common and pressed. Pressed Brick are made from tempered clay—five at a time—superior in quality to those made after the old mode, and at about one-half the cost, by simply changing clod crusher and molds, which can be done in fifteen minutes. This machine makes common brick of superior quality with great rapidity. For Machines or Rights of Territory address the subscriber at Albion, Orleans County, N. Y.
J. A. LAFLER.
Albion, Feb. 20, 1865. 10 2*

A RARE CHANCE IS OFFERED TO OBTAIN AN interest in a valuable Patent. For full particulars address 10 3* BAKER & HEATH, Walpole, Indiana.

JUST PUBLISHED—PLANS OF THE GIGANTIC Hydraulic Docks, at Montreal, accompanied by an elaborate report on the section now in course of construction, by Charles Legge, Esq., Civil Engineer. These plans of one of the greatest projects in the world should be in the hands of all who are interested in manufactures and commerce, or who may wish to establish themselves in business in a city destined to become the Liverpool and Manchester of the Western Continent. Sent by mail, post-paid, on receipt of $2.
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J. L. TRUE, Garland, Maine,
10 2* Patentee and Proprietor.

NO MORE BOILER EXPLOSIONS.—THE UNDERSIGNED having procured from the Government a patent for a new system of preventing the bursting of boilers in the steam engines, as well as for the saving of fuel at the same time that the speed is accelerated, is desirous of finding a capitalist with $8,000 or $10,000 to go in partnership for carrying out the plan of this patent.
Every person who desires to be made more thoroughly acquainted with the concern will please address Dr. F. LAMBRUN, corner Main and Dauphin streets, New Orleans, La. 1*

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THE VENEER FRUIT BASKET.—BEECHER'S PATENT, May 31, 1864.—To all parties engaged in the small-fruit business we offer the above basket. Our basket is stylish, durable and cheap. For circulars of description, price, etc., address
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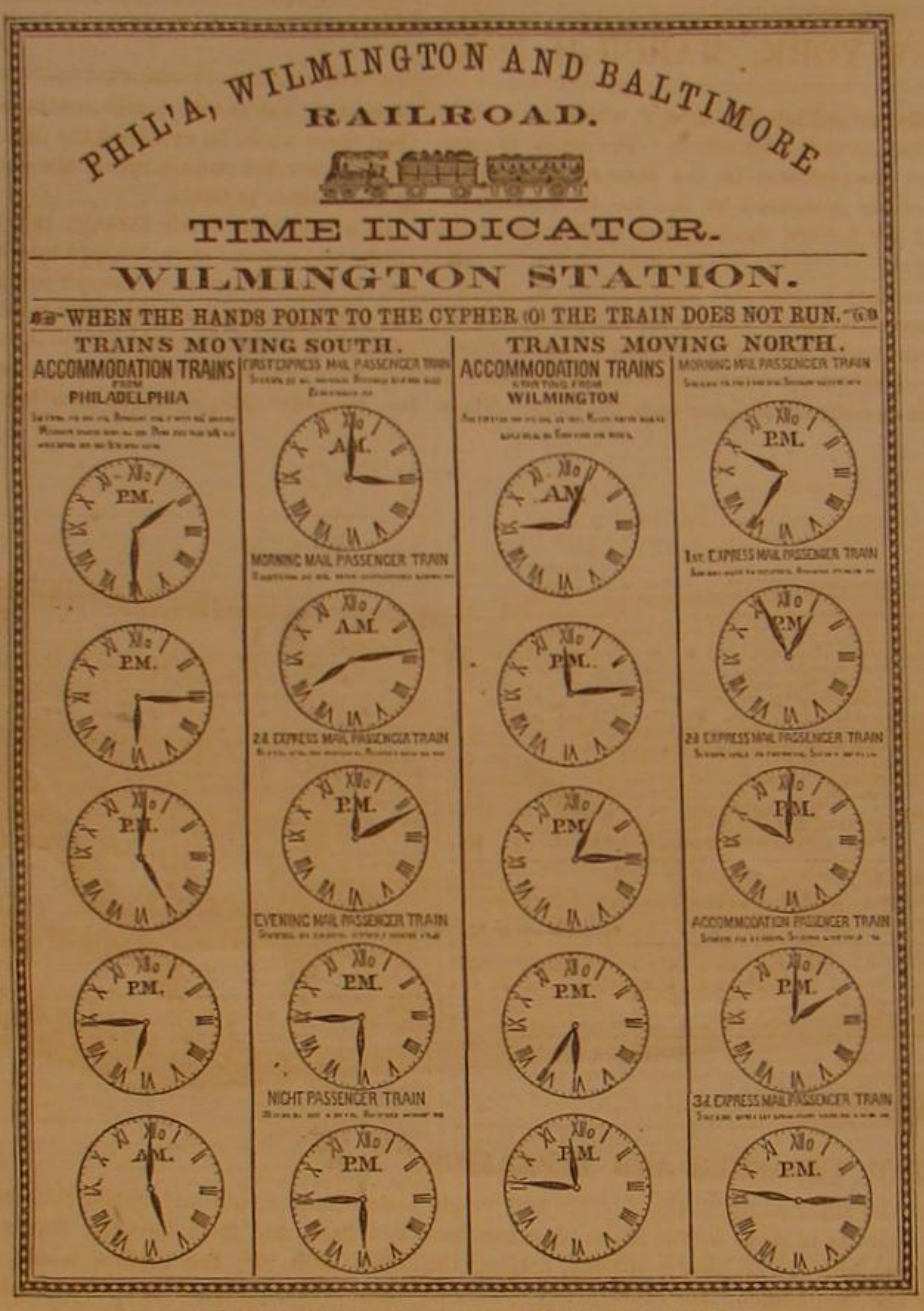
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The Cyclone at Calcutta.

The correspondent of the London *Times* writing from Calcutta on the 23rd Dec., says:—"I see that the news of 12,000 persons having been lost in the cyclone was received with incredulity in England. The estimate was wide of the truth, but only because it vastly underrated the calamity. As every one who knows this country will readily conceive, there is no possibility of ascertaining precisely the loss of life, because hundreds might be swept away and leave no traces behind. But we are not without data for arriving at a conclusion, and it has now been calculated that there cannot have been fewer than 60,000 persons drowned or otherwise killed by that fearful storm. In the island of Saugor alone, before the cyclone, there were 8,200 persons. There are now 1,200—nor have any left it to go elsewhere. 7 000 persons, were carried clean away by the wave. All up the river the population has been swept off, if not in the same proportion, yet in very large numbers. As we all anticipated, disease is raging everywhere—cholera, fever, and smallpox. The epidemic fever, which I mentioned in previous letters this year, is depopulating whole districts. A magistrate told me the other day that he had been riding through a village in which there was hardly a grown-up person left. They had died without hope of assistance, without medicine, without food—for the crops were rotting on the ground in many parts where the salt water rushed in. The Bengalese are in a deplorable plight, and the zemindars increase the general misery by turning the ryots out of their huts because they are behind-hand with their rents. There is money enough to give relief—such relief as can be got for money. But human means seem quite powerless to stop the awful diseases that are walking through the land, carrying thousands before them. The native feels himself ill, wraps himself in his blanket, says it is fate, and so perishes. In this enormous population—let it be remembered that here in Bengal alone we have at least 45,000,000 of people—the few Europeans can only do good here and there, and yet it is solely by Europeans that good is being done. The rich native will not help his countrymen. God gave him his money, and God intended him to keep it. That is pretty much his mode of reasoning. Sometimes the fever strikes him, and then in abject terror he offers English doctors a fee of 500 rupees to come and visit him. In a recent case of that sort, the man—who was worth about four millions sterling—had refused to give a pice to the poor after the cyclone. When death was at his throat he altered his mind, and promised large benefactions if he recovered. He was not spared to add falsehood to his cruel service.

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Vol. XII.—No. 11. (NEW SERIES.)

NEW YORK, MARCH 11, 1865.

$3 PER ANNUM (IN ADVANCE.)

Improved Separator and Thrasher.

This machine is intended to clean and separate grain from the straw at one operation, and to deliver it at the lower or bottom part in marketable condition, free from dust, chaff, sticks or other rubbish calculated to destroy its appearance, soundness and market value. The several motions necessary to effect the object are all combined in the machine here shown, and the appended description will convey a clear idea of them.

The grain to be separated from the straw is fed in to a revolving toothed cylinder contained in the case, A, and driven by the belt over the pulley, B. This cylinder has a space beneath it, concave in shape, which is also armed with teeth or projecting pins. In being drawn through these teeth the grain is stripped from its straw, and passed over the perforated shakers, C, from whence it afterward falls down on to a grain board, D, suspended from the side framing of the machine, by the straps, *a*, while the straw passes on to the rear of the machine. The shakers are inclined in opposite directions, so that no grain can pass off at the end with the straw. The motion of the shakers is derived from a crank shaft, not shown, and they move in opposite directions to each other.

The shakers have not only a reciprocating but a jolting movement, at the same time, so that they act first to expand or draw out the straw, and afterward crowd the same together, so that no grain can be carried off with it. This mode of hanging the shakers so that they move in opposite directions, renders the transportation of the machine in wagons much easier to it, for the tendency to oscillate violently or surge back and forth is almost entirely obviated.

The grain board has a similar jolting and reciprocating motion, but in an opposite direction to that imparted to the shakers, so that while the straw is being thrown in one direction by the shaker the grain is being tossed in another.

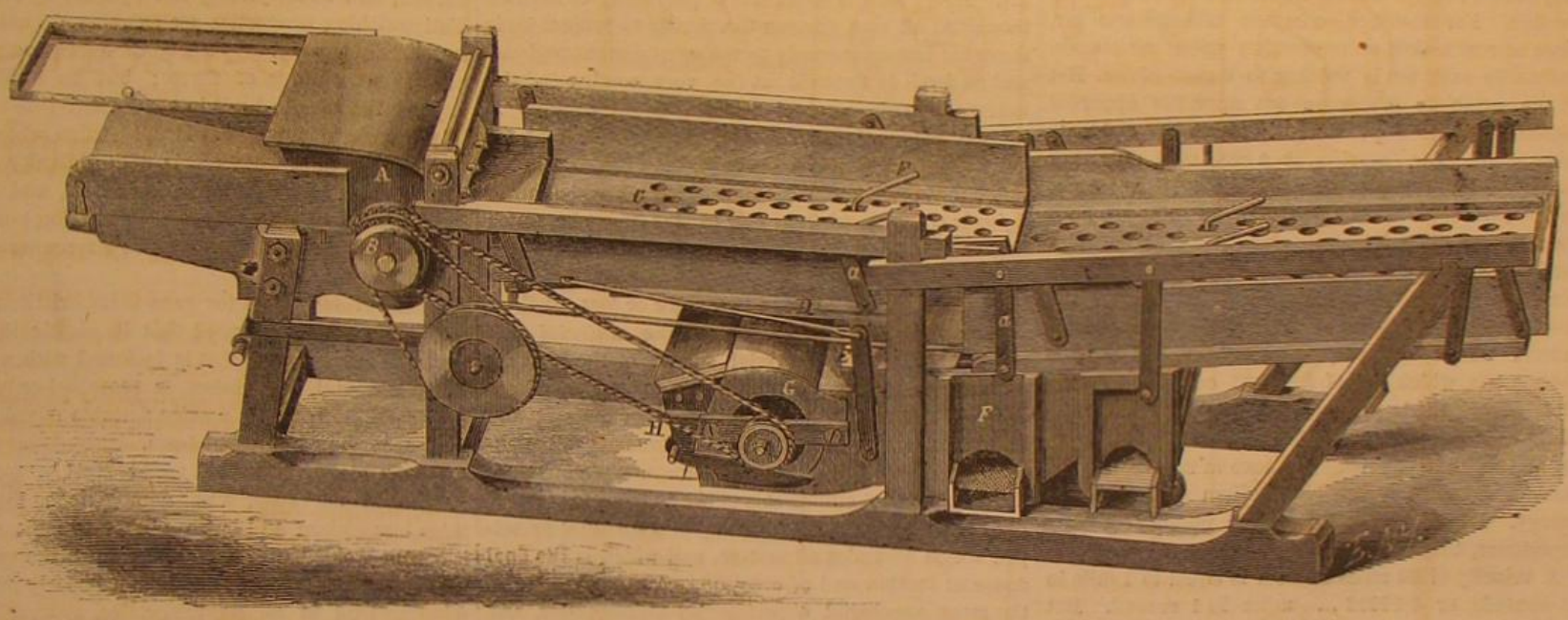
On the shakers, C, there may be seen a set of fingers, F, which are operated by suitable mechanism in the body of the machine. The office of these parts is to expand and contract the grain and straw alternately or to stir it, and also to detach whatever loose grain may still be caught in the straw after its passage through the toothed cylinder.

From the grain boards previously spoken of the grain falls on to an inclined platform, E, and is from thence discharged into the shoe, F, which has a shaking motion given it from above. The grain, in passing from the platform to the shoe falls through a current of air generated by the fan, G, whereby the dust and all foreign matters are driven off at the openings.

The fan case is provided with valves, H, so that if the current of air be greater for the kind or quality of grain under process of cleansing, than is necessary, these valves open and relieve the excess, so that the grain is not carried over with the chaff. These valves can be adjusted by means of levers and weight and the quantity of air or power of the blast can thus be regulated with great nicety without varying the speed of the machine or the other parts. There is also a sieve or riddle within the shoe, upon which the grain is received from the inclined platform, the grain passes through this riddle on to others of finer mesh while the chaff dust, etc., are driven off as before mentioned.

These are the principal details and the operation of the machine. Horse-powers, varying in capacity from two to ten horse, are made and sold in connection with the machine; "Pelton's Triple Gear Iron Horse-power," is the name given it by the manufacturers.

This machine is said to be very effective, and being a combination of two separate ones there is a saving of time and labor. It was patented through the Scientific American Patent Agency on the 20th of September, 1864, by Samuel Pelton, of Trenton, N. J. For further information address the manufacturers, Fell, Pelton & Brearley, Eureka Agricultural Works, Trenton, N. J.



PELTON'S THRASHER AND SEPARATOR.

A STONE FALLING THROUGH THE EARTH.

Messrs. Editors:—In Vol. IX, No. 9, Scientific American, Mr. John A. Roebling, in his remarks on the subject of force in general states that "A rock at rest, that is supported by a secure foundation, produces pressure, but this pressure is no force without motion. The simple pressure is balanced by the reaction of the foundation, but at the same time this pressure is felt through the whole earth." How can that pressure extend any past the center of the earth? Could a hole be excavated through the earth and the rock dropped therein, it would undoubtedly descend until it reached the center of the earth, and there stop, but should it still continue on its course then there would be exhibited the funny phenomenon of an object descending up on the other side of the globe. Ditto. pressure. R. B. S.

[If a hole were made through the diameter of the earth, and a stone were dropped into it, then, were it not for the resistance of the air and the rotation of the earth upon its axis, the stone would descend with constantly increasing velocity till it reached the center, when its momentum would carry it through to the opposite side; it would then fall back with the same movements and would thus continue to oscillate back and forth forever. But if the hole were filled with air, the motion would be resisted, the stone would rise each time to a less distance from the center than that from which it descended, and would finally be brought to rest exactly in the center of the earth, where it would rest suspended so that it could be moved from its position by the slightest breath. This would be the motion of the stone if the hole were made through the axis of the earth from pole to pole. But if the hole were made across this axis, the motion of the stone would be modified by the rotary motion of the earth. In this rotary motion the parts at the surface have a higher velocity than those nearer the axis. The stone, starting from the surface with this higher velocity, would soon come to parts moving with less velocity, and would come in contact with the east side of the hole, against which it would rub till it reached the center. Here its motion due to the rotation of the earth would cease, and as it was carried onward by its momentum, it would come in contact with parts having this motion, and would continue to rub, still against the east side of the hole, till it should be stopped by the friction.—Eds.

Postal Money Orders.—The payment at the New York post office on money orders sent from various parts of the country average at the present time $1,500 a day; and the total sum received by our citizens through this source, during a month past, has been about $35,000. The money sent from New York to the country through the post office does not exceed one third this amount.—*N. Y. Post.*

The area of the end of a cylinder multiplied by ts length equals its cubic capacity.

REMARKS ON THE SUBJECT OF FORCE IN GENERAL.

BY JOHN A. ROEBLING.

[For the Scientific American.]

(Concluded from page 144.)

The greatest mechanical effect results from impact, which is simply an aggregate of developed momenta. In impact the whole force is spent. The value of impact is equal to the mass multiplied by the square of velocity. A chemical explosion results from an instantaneous discharge of the whole pent-up force. The whole energy which is asleep in gunpowder, is roused into simultaneous action. The more instantaneous this development the greater its effect. This effect now is due to the rapidity of motion with which the aggregate massiveness flies apart into atoms. The heat which is rapidly developed in the combustion of powder, converts its solid particles into highly elastic vapors, whose weighty atoms repel each other with immense energy, and whose aggregate force is to be rated like impact by the square of velocity multiplied by the massiveness of the gases.

Only that is considered a natural effect or phenomenon which is experienced in some way by our senses. How an apparent nothing may suddenly become a very severe reality, nature sometimes illustrates very forcibly. For instance, common atmospheric air, when at rest makes no impression upon our senses. Ordinarily such air is nothing to human sense. But let the principle of motion act upon the apparent nothing, and see what a mighty power has suddenly sprung up. Air, moving at a rate of 3 miles per hour, produces a pleasant breeze; at 10 miles per hour, it becomes a high wind; at 30 miles per hour a strong gale will be experienced; but at 80 miles per hour a hurricane will sweep along whose terrific force will demolish massive buildings, uproot the stoutest trees, and level to the ground forests whose growth has consumed centuries! These terrible phenomena, which are of frequent occurrence, very plainly teach the important fact, that by the element of time alone—that is, velocity—the thinnest, lightest and most attenuated substance in nature may be transformed into a terrible medium of destructive energy. Because these things are matters of daily experience, they are seldom reflected upon.

A velocity of 80 miles an hour is equal to 1 mile in 45 seconds, or 0·02222 . . . miles in 1 second. But how small is this velocity, when compared to the speed of electricity, of light, or of thought, which is spiritual motion? Light is known to move at the rate of 195,000 miles in one second, which is 8,775,877 times the velocity of a hurricane moving 80 miles an hour. Suppose now the velocity of air increased to 195,000 miles per second, then the impact or total energy of this force would be to the energy of a hurricane $1^2 \div 8{,}775{,}877^2 = 1 \div 77{,}016{,}000{,}000{,}000$. The energy of force, therefore, resulting from the velocity of light, imparted to air, would be more than 77 million of million times as great as the energy of a hurricane. And invariably we are authorized to conclude, that an ethereal substance, moving 195,000 miles per second, will produce the same mechanical effect, as a hurricane, provided this ether is 77 million of million times as light as is atmospheric air.

The object of the above calculations is not to institute a comparison between the nature of the motion of air and of light, but simply to point out the great importance of the element of speed or of time. Nature's internal silent actions are produced by motions of inconceivable rapidity, so great that they are invisible to observation. And in the same ratio as the square of velocity of these movements *increases*, may the massiveness or weight of the moving substance be *decreased*. It is known that the impingement of the particles of air, when moving at hurricane speed, and acting upon each other, and upon other substances, produce friction, heat and electricity. When acting upon the exposed rocks and metals of the mountains, the same force will disintegrate them and carry them along through the atmosphere. But how much more potent is not the energy of lightning. The friction of the air produces intense heat and light, phenomena which accompany every stroke of lightning.

Electric action is an inner dynamic process, by which matter is moved, transformed, and energy produced. The principle of motion is *uncreated*, it can therefore only be communicated or transmitted from one substance to another substance or from one process to another process. But to transmit or communicate, requires a medium, and this medium is ether, the universal substance which permeates all natural substances and fills all space. If a suspended piece of iron is attracted by a magnet, the attractive force acts through the medium of ether. By the process of magnetism the peculiar magnetic motion is communicated from one particle of ether to another, and these transmitted energies, which result from the mutual action of the two bodies, overcome the gravitating tendency of the iron.

The motion of light is 195,000 miles per second. But this is only the outer velocity of motion, which communicates energy from one particle of ether to another. Light is not a substance, but only the effect of luminar energy. The internal spiral motion, which may be the inner cause of the outer motion, may result from a velocity of which we have no conception.

Human thought is elaborated in the human brain by a material process, which is matter in motion. As repeatedly said, the principle of motion in itself is nothing, in a natural sense; it becomes a reality only through the massiveness, the inertness of matter. Every man is conscious of the reality of his own thoughts; all men possess the faculty to project their thoughts instantaneously to the most distant regions, and to dwell in thought at the very confines of the universe. This is actual motion, whose rapidity is beyond calculation. The speed of mental light far surpasses that of physical light. And from this we infer, that the ethereal medium, through which outer light is transmitted from star to star, must be much denser than the more interior spiritual essence, which conveys the flashes of the human brain.

There always have been two more or less distinct schools of philosophy, known as the *material* and the *spiritual*. The material school of the present day maintains that the final cause of motion, of energy, of life, resides in the elements of matter; and that by the combination of these elements all complex structures and organisms of nature are built up. The other school admits this view, as a matter of fact, but at the same time insists upon a spiritual principle, which pervades all matter, and which is the final cause of motion and of creation. Although some of the most successful experimental philosophers, and some of the first physiologists of the present age, advocate the pure material hypothesis, yet when the arguments and facts of both sides are calmly balanced, the unprejudiced mind, which only cares for truth and nothing for authority, will unhesitatingly embrace the spiritual philosophy, as the only one, which does rationally account for life and existence.

The advocates of pure materialism object to the idea of a *Final Cause*, yet Auguste Compte, in order to introduce some unity into chaos, was laboring hard to find out some sort of primary cause, which governs the harmony of the whole, and he accordingly pointed out, that gravitation perhaps might answer that purpose. But there are hosts of great men in continental Europe, living and teaching, as for instance the excellent Prof. Moleshott, now at Turin, who consider it entirely beneath themselves, to look for any such primary cause. In fact, then, men do only *indirectly* acknowledge the *unity* of nature, because if they did *directly*, they would be *forced* to look for some *central cause*, to which this *unity* refers, and from which it proceeds. To say that 65 or 70 chemical elements possess a natural instinct, which makes them act according to law, and that all processes of nature are governed by their inherent affections and lawful tendencies of matter, leaves us only to wonder and to guess where these miraculous laws come from? Nor does this view explain why all these apparently incongruous materials and agencies behave in such *perfect* accord and unison, that the grand objects of creation, its growth and development are accomplished; nor why the motions of the whole immensity proceed according to rigid and invariable mathematical principles? Where did the idea, this law of mathemetics, originate? Which is prior or first—the idea or its application? Did the scientific plan of the universe originate in the 65 chemical elements? Or were these elements constituted according to those ideas, and instinctively endowed with scientific tendencies, in certain well defined channels, and for certain well understood and *pre-ordained* and fixed purposes and ends?

The science of mathematics, in its largest sense, is the science of space and time, consequently it is the science of material creation; all other sciences refer to it and are built upon it. There can only be one true *abstract* science, and this is the science of mathematics. Other sciences are only collections of systematized experiences and observations, without any abstractions. But *before* that immense *abstract* science which *does* regulate and govern the universal process of material existence, could be spontaneously evolved as a *material* demonstration, the Great Mathematician, the Great Central Brain of the Universe, had to exist! The science of mathematics is simply a spontaneous outflow from the Central Source of Life, and this spiritual out-flow has manifested itself in mathematical forms and motions through the vehicle of matter. Pure materialism is a growth of human self-conceit, while simple truth will always tend toward a divine Central cause!

HIGH AND LOW STEEL.

We extract the following remarks on this subject from "Holley's Ordnance and Armor:"—"By high steel is meant that which contains a large amount of carbon, and consequently low specific gravity. Its distinguishing properties are extreme ultimate tenacity, hardness, and capability of extension without permanent change of figure; but its extensibility beyond the elastic limit is small, and it is therefore brittle under concussion. It will harden when heated and immersed in water; it is with difficulty welded, because it deteriorates under high heat, and because its welding heat is so very near its melting point; and it is melted at a low temperature as compared with wrought iron.

"Its obvious defect for guns is its brittleness; but if so large a mass is used that its elastic limit will never be exceeded, or if it is jacketed with a less extensible metal, this defect is remedied or modified. Low steel, however, is a more suitable metal for cannno, according to present tests.

"Low steel, also called 'mild steel,' 'soft steel,' 'homogeneous metal,' and 'homogeneous iron,' contains less carbon and has a higher specific gravity; it can be welded without difficulty, although overheating deteriorates it, and it more nearly resembles wrought iron in all its properties, although it has much greater hardness and ultimate tenacity, and a lower range of ductility, depending on its proportion of carbon. It has less extensibility within the elastic limit than high steel, but greater extensibility beyond it; that is to say, greater ductility.

"The grand advantage of low steel over wrought iron, for nearly all purposes, is, that it can be melted at a practicable heat and run into large masses; thus avoiding the serious defect of wrought iron in large masses—want of soundness and homogeneity. Its other important advantages for cannon are, greater elasticity, tenacity and hardness.

ELASTICITY AND DUCTILITY.

"Mr. Anderson, Sir William Armstrong, Mr. Mallet, and others, complain, in various public statements, that most of the steel they have experimented with for guns is too brittle—that it gives way under *sudden* strains, which wrought iron will stand. Hence steel, especially high steel, has been condemned as a cannon metal.

"In answering this objection let us briefly review what has been said under the head of 'ductility.' Suppose two thin tubes of equal size, one of high steel and the other of wrought iron, to be subjected to the violent and sudden strains of gunpowder. The elastic limit of the steel is overcome, and it soon breaks, because it has but a small reserve of ductility to draw upon, to eke out its integrity. The elastic limit of the wrought-iron tube is overcome much sooner, but it has an immense capital of ductility to expend, and so it stretches and stretches for a long time without fracture.

"Now suppose the quantity—thickness of steel to be increased just so much that the pressure—proof charges, for instance—will never overcome its elastic limit, that is to say, so that its particles will return to their original position after the pressure ceases. Its original resistance to the next strain is then unimpaired, and there is no evidence that it will ever be-

come impaired; for elasticity is simply the antagonism between two tireless and changeless forces—repulsion by heat, and the attraction of cohesion.

"But in order to bear the same pressure (and the demand is for the highest possible pressure of powder), the iron, equally increased in quantity, will stretch beyond its elastic limit, and therefore must depend upon a new arrangement of particles and a new limit of elasticity for continued cohesion. Its great ductility allows this re-arrangement to continue for some time; but although it may stretch to a less distance at each renewed application of the pressure, its ability to stretch and its range of elasticity are constantly diminishing, until it at last arrives at a point where it can stretch no further without fracture. It has exhausted its reserved ductility. If it were not so, iron would never be broken at all by stretching. In addition to this, although a given area of stretched iron may sustain more than the same area of the original metal, the total area is constantly diminishing. It is, to a great extent, a substitution of a little strong iron for much weak iron. In order to endure *as long* as the steel, the iron must be still greater in quantity, because the 'work done' to raise it to its limit of elasticity is less than that required to raise steel to its limit of elasticity.

"This explains the failure, after short service, of thin tubes made of the moderately high steel heretofore used, while thin iron tubes *appear* to be unimpaired by elongation, although they certainly are impaired from another cause—compression. It is simply a question of excess of metal and, practically, endless endurance, on the one hand, and ultimate failure on the other hand.

"The serious mistake in the use of the steel heretofore obtained, for extreme charges of powder, appears to have risen from the neglect of the whole subject of the elastic and the ductile limits. Because the *ultimate strength* of steel was higher than that of iron, the quantity of the material has been proportionately reduced, when its quantity should have been proportioned to the work done in overcoming its resistance to extension.

"If steel, or any metal requiring the highest attainable effort of force in motion to stretch it *within* its elastic limit, could also be made to have a great range of ductility beyond it, the safest and most perfect cannon-metal would be obtained. But unfortunately, as the one property increases the other decreases. Low steel, the amounts of metal being the same in each case, would stand more pressure than iron within the elastic range, and would stand sudden strains longer than high steel; but its elastic limit once exceeded, from any cause, it would fail sooner than wrought iron. As a compromise between high steel and wrought iron, it has this advantage, that a small increase of weight of material will b[illegible] considerable increase of pressure, within the limits of safety.

"But according to Mr. Kirkaldy's experiments, the lower steels have a considerable degree of extensibility before fracture, and so much tenacity that the work done in stretching them to rupture actually exceeds that required to rupture the best wrought iron."

An English Operative in an American Factory.

A Sheffield cutler, working in one of our Eastern factories, wrote to his comrades at home stating his views of our workshops, etc. We make an extract from his letter. The remarks about the division of labor indicate a lack of knowledge. It is practiced more extensively here than elsewhere, and our manufacturers were the first to institute regularly organized plans for accomplishing specific objects.

The great number of large works—cotton, woolen, edge-tools, files, table knives, indeed all kinds of trade—carried on, and in a first-rate style, too, will soon enable them to compete with England for the markets of the world. Look out, you at home; go ahead, or the Yankees will trip you up in trade matters. I don't think they could compete with you yet in their own markets but for their tariff. They have not got the division of labor amongst the materials, as you have; they have not the iron and coal, and the material trades so concentrated as you have, and then, from the demand for labor, don't work for so little as you do. Steel comes from one distant town; tip handles from another; coals and bone handles, wire tools, etc., etc., from others. Ivory in tusk is six dollars a pound. They do far more with machinery in all kinds of trades than you. Men never learn to do a knife through, as they do in Sheffield. The knives go through thirty or forty hands. One matches and resins all; another pins all; another bores all handles; another glazes all blades, and another buffs all handles. I myself glaze and chill all the better knives they make at Hanover Works, and nothing else, from day to day. If a Yankee can resin a knife on, they call him a cutler; and by doing one thing all the time they become very expert, and make some very good knives. Not the variety you make, but such patterns as are done easiest by machinery, and there is a large quantity made, I assure you. The Englishmen get the best wages, because they can go to any part of a knife, and the Yankee don't like it. The system of managing here is for one man to be responsible for the forging of blades. All are made by trip hammers. He is a practical man, able to mend tools and see all the machinery is in order; he is called the 'boss blacksmith.' Another attends to the grinders and sees that the blades are properly done, and the orders attended to. Another attends to all the steel forks. The last came from Sanderson's, Carver street, Sheffield; [the former, doubtless; not the forks, certainly;] he attends to all the hands engaged on forks. Then the work we call hafting is let to a job hand who employs all the men he needs to put the work through. He takes the job at so much the hundred. All are reckoned by the hundred here, and are taken, carvers, tables and desserts, at one price, in most cases; but grinding and less carvers get the better above all these bosses. There is what you call a table knife manager who gives out the materials as toe come in to those they belong to, sees they are finished right, and to whom the superintendent refers all letters and information as to what is wanted, and he sees that the things wanted are attended to and put through. The superintendent is the head 'boss' over the men, lets the jobs, sets the price, turns off and sets on, and keeps a few hands always at liberty to go from job to job when needed; and these are called 'company hands.' All are Englishmen, who know how to go at any part of a knife, for the Yankees are brought up to one or two jobs and cannot shift about. Men who have jobs, matching and resining, for instances, set on and turn off their extra hands as they like, and if any of them are stuck with their work, the 'company's hands' are sent to help them out, and he has to pay them after the rate the company pays. They work by the hour. I am a 'company hand,' so is Joseph H———, and H. B———. The superintendent is responsible to a board of directors, elected by the company, who are shareholders. Nearly all the works here are shareholding concerns, and there is such smashing up amongst these companies! The shareholders differ from the managers, the managers get experience and set up for themselves, or demand nearly all the profits. The orders are not sent direct to the works, but they have agents or sale-shops at New York and other places, who send the orders and keep, if possible, their shelves fully supplied with trashy articles. The people here are far more steady than in Sheffield. Men seldom go off drinking here. There are no 'bull weeks,' and no holiday at the Christmas time unless you take it. The works were not stopped one hour this Christmas. There are no beggars here; all seem very well off, and far better dressed than working men in Sheffield, and far cleaner. The methods of working are far easier; indeed, the Yankees will not do hard work, if possible. There are not as many files used among 200 men as you could put in your pocket.

[There are some funny statements here, and some that are quite incredible.—Eds.

Remedy for Scale in Boilers.

We have been shown a large fragment of some foreign matters which had been deposited on the boiler of the steamer *Bowman*. This scale was removed by "Temple's Liquid," a preparation for the object in question now much used in different parts of the country. It is stated that this article is a perfect remedy for the trouble, and is guaranteed to give satisfaction in all cases. Attention is directed to an advertisement in the usual place.

Shells and Beaver Skins for Money.

Amongst the objects of natural history and ethnology brought from British Columbia and Vancouver's Island by Mr. J. K. Lord was a belt composed of numerous specimens of a species of *Dentalium* strung together.

"It is somewhat curious," observes Mr. Lord, "that these shells (*Entalis pretiosus*, Nuttall sp. *Entalis vulgaris?*) should have been employed as money by the Indians of North-West America—that is, by the native tribes inhabiting Vancouver's Island, Queen Charlotte's Island, and the mainland coast from the Straits of Fuca to Sitka. Since the introduction of blankets by the Hudson Bay Company, the use of these shells, as a medium of purchase, has, to a great extent, died out, the blankets having become the money, as it were, or the means by which everything is now reckoned and paid for by the savage. A slave, a canoe, or a squaw, is worth in these days so many blankets; but it used to be so many strings of *Dentalia*. In the interior, east of the Cascade Mountains, the beaver skin is the article by which everything is reckoned—in fact, the money of the inland Indians.

"The value of the *Dentalium* depends upon its length; those representing the greater value are called when strung together, end to end, a 'Hi-qua'; but the standard by which the *Dentalium* is calculated to be fit for a 'Hi-qua' is, that twenty-five shells placed end to end must make a fathom, or six feet in length. At one time a 'Hi-qua' would purchase a male slave, equal in value to fifty blankets, or about $250. The shorter and defective shells are strung together in various lengths and are called 'kop-kops.' About forty 'kop-kops' equal a 'Hi-qua' in value. These strings of *Dentalia* are usually the stakes gambled for. The shells are generally procured from the west side of Vancouver's Island, and towards its northern end; they live in the soft sand in the snug bays and harbors that abound along the west coast of the island, in water from three to five fathoms in depth. The habit of the *Dentalium* is to bury itself in the sand, the small end of the shell being invariably downwards and the large end close to the surface, thus allowing the fish to protrude its feeding and breathing organs. This position the wily savage has turned to good account, and has adopted a most ingenious mode of capturing the much-prized shell. He arms himself with a long spear, the haft made of light deal, to the end of which is fastened a strip of wood placed transversely, but driven full of teeth made of bone, resembling exactly a long comb with the teeth very wide apart.

"A squaw sits in the long stem of the canoe and paddles it slowly along, whilst the Indian with the spear stands in the bow. He now stabs the comb-like affair into the sand at the bottom of the water, and after giving two or three stabs draws it up to look at it; if he has been successful, perhaps four or five *Dentalia* have been impaled on the teeth of the spear. It is a very ingenious mode of procuring them, for it would be quite impracticable either to dredge or net them out, and they are never, as far as I know, found between tide-marks.

"At one period, perhaps a remote one, in the history of the inland Indians, these *Dentalia* were worn as ornaments. I have often found them mixed with stone beads and small bits of the nacre of the Haliotis, of an irregular shape, but with a small hole drilled through each piece, in the old graves about Walla-walla and Colville. In all probability these ornaments were traded from the coast Indians; but as these graves were quite a thousand miles from the sea, it is pretty clear the inland and coast Indians must have had some means of communication."—*Technologist.*

Slow and Sure.

Mr. Thomas Cook, correspondent of the New York *Herald*, writes as follows from Fort Fisher:—

"The enormous shells of the monitor were thrown with unerring precision at so short a range, every one exploding with effect. Not a shot was wasted from this vessel. Although she fires but slowly, she accomplishes infinitely more in attacking such a work than all the rest of the fleet combined. With her it is a perfect matter of indifference whether the fort responds or not; and at every discharge cartloads of sand are shoveled out of the wall of the fort."

Fuse for Blasting.

Blasting coal in dry situations has been performed in the anthracite coal regions of Pennsylvania mostly by the needle—a round piece of iron or copper, from three to five feet long, tapering from five-eighths of an inch to a point. The needle is inserted in the cartridge or charge of powder, to the depth of a few inches, when the powder is pushed to the extremity of the hole which is tamped by moistened fine coal to its mouth. The needle is then drawn and a squib and match are fixed in the space occupied by the needle, by which means the charge is exploded.

In wet situations, where feeders of water are cut by the drill hole, an iron tube is resorted to. This tube is made from three to four feet long and about a quarter of an inch in diameter. To use the tube, a water-proof cartridge is made on a proper former. The cartridge is charged with powder within a few inches of being full. Before the upper end is closed the tube is inserted and secured by means of a piece of string which wraps the end of the cartridge over the end of the tube in such a manner as to make a water-tight joint. The tube and cartridge are then placed in the drill hole and tamped; the charge is exploded by means of an ignited squib running through the tube. Simple as these modes of blasting appear they are open to serious objections. With the needle the hole is apt to collapse after the needle is drawn, or the charge liable to be prematurely ignited by the friction occasioned by the operation of tamping, or of drawing the needle; the lives of the miners are then in imminent danger. The danger is not so great in using the tube, but it has the disadvantage of being unwieldy; and when the veins dip at the rate of 40° and upwards, as they very often do, if the barrel is not chained it is blown away down the excavation among the loose coals where it is not safe for the miner to search for it. And in more favorable instances, where the tube is found it is often bent like an S, or perhaps broken in two or three parts, when a new tube is necessary. In a strong coal a tube does not often fire more than half a dozen blasts. Sometimes when chains are used to secure the tubes, the blasts force both chains and tubes into the breast when all are lost, costing together almost as much as a miner's day's work is worth. And when the chains hold on to the tubes they often have to be dug out from under tuns of loose coal.

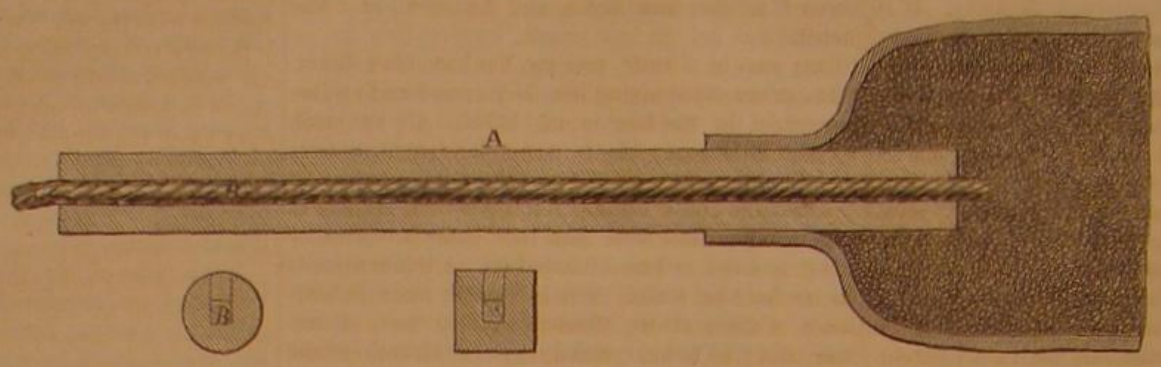
To avoid all this unnecessary labor and to render the operation of blasting more safe, an improved safety fuse has been invented and is here shown, it may be used in coal as in rock. The fuse resembles a case of wood, A, about three-eighths of an inch thick, either round or square, and of any desirable length. Within the case is a train of powder, a small piece of fuse made in the usual way, or a small thread of gun-cotton. The combustible material, B, is laid along a groove cut in a piece of wood and then covered over by oakum and pitch or any water-proof material to protect it from the action of moisture. In case of gun-cotton being used a piece of wood is fitted into the upper part of the groove and secured there by glue. The whole outer surface is covered by a coat of pitch and tar to make the fuse water-proof. This fuse is not only intended to be used as a substitute for the iron tube in blasting coal, but also in rock, where, owing to the protecting case, the train will not become detached by the cutting of the fuse. The invention was patented through the Scientific American Patent Agency, Jan. 3, 1865, by Thomas H. Walton, of Ashland, Pa. Further particulars can be had by addressing the inventor.

Water-proof Cement.

Mr. Joseph Schofield, of Wappelo, Iowa, writes us that he makes a valuable water proof cement by the following recipe:

Take new sweet cheese and work it in hot water until the butter or greasy portion is all removed. This changes the cheese into a tenacious slimy mass. When thoroughly washed, remove the cheese to a hot stove, and knead a quantity of air-slacked lime in so that the mass will be sufficiently stiff for use. It must be applied forthwith as it sets rapidly. The articles to be joined must be heated quite hot, as high as 200°, or scalding water, then united and bound so they will remain in contact until set; in about three days the articles may be used. It is said that this cement is capital for aquaria; also for wood, glass and stone, or earthen ware. Mr. Schofield states that he has tried it on a steam boiler and that he made a "soft patch," so called by boiler makers, with great success.

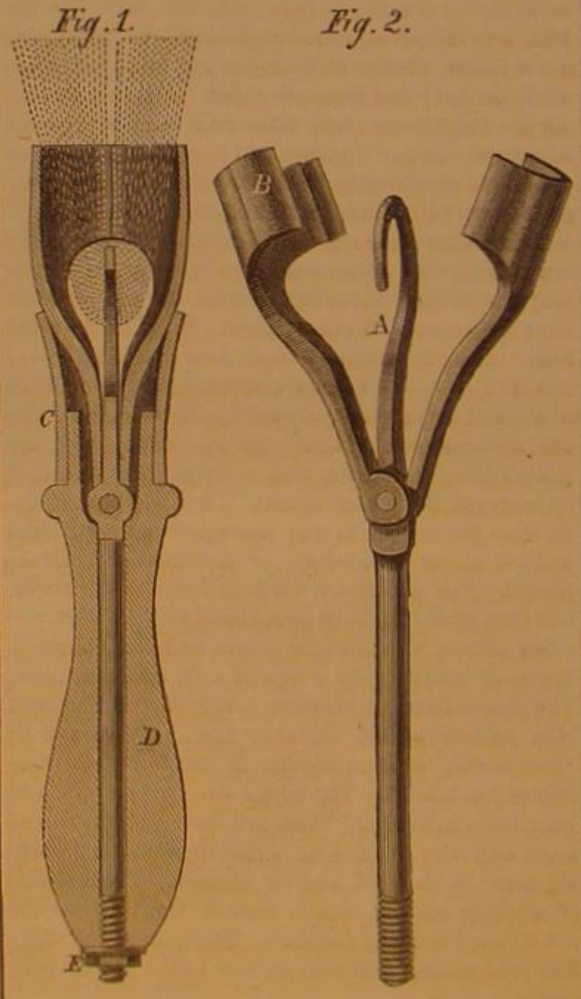
As the materials from which this cement is made can be had any where in rural districts, it will be well for engineers and housekeepers to bear it in mind.



WALTON'S FUSE FOR BLASTING.

RUDOLPH & KASEFANG'S BRUSH HANDLE.

Iron castings when taken out of the sand have a large portion of the same adhering to the rough sides, and many men get a living by cleaning off this sand so as to render the castings fit for use. The instrument they employ for some parts of the work is a wire brush. Convenient lengths of wire are taken and doubled over and bound together; the free ends of these wires form the brush, and is used as any other utensil of its kind. These brushes can be used up to the handle, but that portion which is grasped, must be thrown away when the brush part is worn up short, so that quantities of wire are thus wasted, which ought not to be.



The object of the handle illustrated in Figs. 1 and 2 of the engraving is to hold the wires firmly and cause little or no waste in material. The wires are turned over the hook, A, as shown by the dotted lines in Fig. 1, and then bound by the clamps, B. These clamps are hinged and the ferule, C, holds them both firmly closed. The handle, D, is removed by taking off the nut, E, when the brush is to be renewed.

This arrangement gives a firm support to the wires and a most convenient handle to the brush, while it is far more economical than the present brushes for the purpose. It was patented through the Scientific American Patent Agency, on the 29th of November, 1864, by Fred. Rudolph and William Kasefang; for further information address them at 21 Essex street, Jersey City, N. J.

A Peculiar Wages Arrangement.

In the last number of the *Technologist* there is a description of a sugar refinery in Bengal which closes with this statement:—

"Lastly. We may remark that the wages of every *employe* in the Cossipore factory, from the head boiler down to the coolie, who carries the bags of sugar (weighing nearly two cwt.) to the export warehouse—that all these wages are calculated according to the production of manufactured sugar during the month. The result is, that every one works with a sense of self-interested alacrity, which would astonish some of those complacent Englishmen who regard the Hindoos as a set of lazy, lethargic barbarians.

A PRACTICAL PLAN FOR DESTROYING THE SPAN WORM.

On Tuesday evening, Feb. 21, Dr. Trimble, of Newark, N. J., the well known naturalist, delivered a lecture before the Horticultural Association, at the American Institute, on the span worm, or measure worm, that is so destructive to the shade trees of this city. Though the lecture occupied more than an hour in delivery, it was listened to by the large audience present with quiet interest from beginning to end. The success of Dr. Trimble in securing and holding the attention of a promiscuous audience for so long a time on the subject of a single worm is attributable partly to his own interest in the subject, and partly to the happy plan of giving his lecture the narative form. He read a diary of his observations throughout the season of the insect's life.

THE EGGS.

The lecturer first exhibited a handful of branches on which were large numbers of eggs, and called attention to the fact that the eggs were nearly all on the lower sides of the limbs. He stated that no degree of cold injured the eggs, but that when ice collected on the branches it was sometimes fatal to them.

WONDERFUL INSTINCT OF THE MOTHER.

The diary commenced with the coming forth of the leaves on the 8th of May. The degree of warmth that is necessary to bring forth the leaves is also just the degree that is required to hatch the eggs. The mother knew this last July when she deposited her eggs, and therefore selected those trees which would put forth their leaves at the same time that the eggs would hatch.

"It may be asked, How do these little feeble, fluttering things know which are the right trees? I can not answer. We call it instinct. But what is instinct? It is a word we use to answer a question, but it is not a definition. The insect world is full of such wonders. They are the manifestations of the guiding hand of God Almighty."

JARRING THE TREES.

"June 9. Visited Brooklyn to-day to see the worms. At one place I saw a negro man with a pole some 20 feet long, with a cross piece about six inches in length fastened to one end of it; and with this he was jarring the 'critters', as he called them. He was the most sensible man I have ever met with on the worm question. He jarred and jarred, and I picked up till I got my handkerchief full, and then he killed the remainder."

THE CEDAR BIRD.

"Later in the day, after a shower, I visited Madi-

son Square to see about that flock of cedar birds. While talking with the keeper of the park about them, I heard the familiar low, whispering whistle, like a boy just beginning this accomplishment of youth, when he cannot get out the sound above his breath. Soon a few could be seen coming to a tree near us, and very soon more, and then almost continuously, until several hundreds were busily at work within fifty yards. These birds have been every day more or less for two weeks, generally coming early in the morning and towards evening, but often at other times also. To-day they grew so familiar from being undisturbed, that I could approach within three or four yards of those at work on the under branches. Here was no necessity to kill and dissect to know what they eat.

"The cedar bird has not the foot of the woodpecker and creepers; they are not so graceful in the pursuit of their game as the orioles and warblers, but they have become wonderfully expert in taking these span worms. Sometimes they will reach out to their utmost extent from the twig they stand on to the worm on another; often the twig yields so much to this pressure in the opposite direction, that the bird misses the worm, and has quite a flutter to recover himself, but as soon as righted up, he tries again, persevering till he gets the prey. Often they would take the worm from the end leaf of a pendent twig, where there was no way of reaching it except on the wing as the fly catchers do, hovering over their intended victims like the king fisher and the ospray.

"Some few of the worms are already curling the leaves that are to be their cocoons. As soon as they shut themselves up in these houses, they begin to contract in length, the lower part of the body grows larger, and they lose their activity. This seemed something new to these birds, and I was very much amused at the difficulty they had in getting the worms out; especially where the bird and worm—or rather chrysalis—were on separate twigs. The bird, when he would take hold, would pull hard, bringing the two twigs suddenly together, and leaving no chance of purchase; then he would let go and away the two would separate with a spring. It would now take sometime to adjust matters, but he would try again. In one case I counted ten attempts before the prize was secured.

WHAT TO DO.

"June 10, I had a long talk to-day with the keeper of the Union Square. He told me the birds are more numerous this year than ever before, and he has watched them carefully for years. He told me he had tried to have the parks closed during their visitation, so that they should not be disturbed by the people, especially by the children, but could not succeed. But one wet Sunday that park was closed. The birds came in a great flock, and would come to the ground and even on the benches after the creeping worms. This was the most valuable testimony I have ever got on this question.

"Should these birds come just so another season, and the people or the city government close the parks and fill them with poultry, and then jar down faithfully, the worm pest could in a single year be placed at the mercy of the Ichneumon fly."

MANUFACTURE OF BELLS.

At the meeting of the Polytechnic Association on Thursday evening, Feb. 23d, Mr. Harrison, of the Am. Bell Co., New York, described the process of casting bells, and made some very interesting remarks in relation to the manufacture.

THE FIRST AMERICAN MANUFACTORY.

Until within a few years there was but one establishment in the country devoted exclusively to the manufacture of bells, and that was the foundery of Mr. Meneely, of Troy, in this state. About thirteen years ago, Jones & Co. went out of Meneely's employ, and commenced business on their own adcount, and now there are several bell making establishments in the country.

MAKING THE MODELS.

Formerly the models for all large bells were built up of brick work. When we get an order for a bell of given weight, we first estimate the size for the prescribed number of pounds. Then the drawing is made with great care of the profile from the center to the flange on one side of the bell for both the outside and inside lines. The space beween these lines indicates the thickness of the bell in all its parts. This drawing is then transferred to a board, and the board is cut to the line. The mold for the interior is built up of brick and mortar, the form being given by attaching one edge of the cut board to a shaft rising out of the center of the pile, and sweeping the board around the mass. Then a layer of molding sand, corresponding in thickness and form to the bell, is packed upon the core, the external form being given by sweeping the board which has been cut to the outer profile of the bell around the layer of sand. A brick-work mold is then built over the sand. This outer mold rests upon an iron plate so that it may be raised up by a tackle to remove the sand, when it is lowered to its place again, and the mold is completed.

This was the former process, but soon after Jones & Co. commenced operations they introduced an improvement in molding which effected a very great saving in the cost of bells. This inprovement consisted in fashioning for the mold two iron shells, one for the core and the other for the outside, provided with great numbers of pins for holding layers of molding sand in place. A patent for this improvement would have been an immense fortune, and both Jones & Co. and Mr. Meneely applied for one, but they failed, as it was shown that the invention was made by a workman of the name of Peacock.

STEEL BELLS.

The steel fire bell for the city of San Francisco, which was exhibited at the park in this city, was cast by Naylor, Vickers & Co., of England. The metal for that bell was melted in 106 pots of 100 lbs. each, and it took 106 men to pour it. By improvements which have been made in this country we can now cast a bell of that size by the labor of six men, and the cost is reduced from $1 per lb. to 25 cts. per lb. The steel is made in the same furnace in which it is melted.

EFFECT OF THE TOPOGRAPHY ON THE SOUND OF BELLS.

We sent one of our steel bells weighing 800 lbs. to the western part of this state, and received word from the purchasers that it could not be heard two miles. Having an order from Ohio for a bell of the same size, we gave directions to have this bell forwarded to fill the order. The Ohio purchasers wrote us that the bell could be heard eight or ten miles.

COST OF BELLS TO NEW YORK CITY.

The cost of renewing bells in the place of those broken in the city of New York is $20,000 per annum. And for the last year it will amount to $40,000. When the clapper strikes in one place, if the metal is too soft a hole is soon beaten through, and if the alloy is two hard the bell will be cracked. Several efforts have been made to prevent the clapper from beating in one spot. One plan is to have the bell slowly revolve, another is to have the clapper revolve around the axis of the bell. This plan has been successful, increasing very considerably the durability of the bell.

EFFECTS OF TEMPERATURE ON CASTINGS.

When we cast eight or ten bells from the same reservoir of metal, we find that the one cast first has a different tone and quality from the one cast last, and this is doubtless due to the gradual cooling of the metal. I am trying to make a pyrometer to measure the temperature of our metal in order to obtain a more uniform quality of bell. If the metal is too hot when the casting is made the bell will be brittle, while if it is not as hot as it should be it will not be closely and firmly united.

The time of adjournment having arrived Mr. Harrison promised some further remarks at the next meeting.

Torpedo Guard.

An effectual guard to the gunboats liable to be attacked by torpedoes has been devised. It consists of a net suspended from a spar lashed athwart the bowsprit. The lower edge of the net is some distance under water, and has a line rove through it, attached to which are shot to sink it to any required depth.

To find the solid contents of a cone, multiply one-third of the area of the base by the hight.

A TUBE twelve inches diameter and twelve inches high holds 5.875 United States gallons.

REMINISCENCES OF GLASS-BLOWING.

Messrs. Hurd and Houghton, of No. 401 Broadway, New York, have published a little book of 116 pages by Deming Jarves, entitled "Reminiscences of Glass-blowing." It is written in a very pleasant, readable style, and a good idea of its contents may be obtained from the following extracts.

CURIOUS ACTION OF A GLASS ROD.

"Place a tube, say two feet long, before a fire, in a horizontal position, having the position properly supported, say by putting in a cork at each end supported by pins for an axis; the rod will acquire a rotary motion round the axis, and also a progressive motion towards the fire, even if the supporters are declined from the fire. When the progressive motion of the tube towarde the fire is stopped by any obstacle, the rotation is still continued. When the tubes are placed in nearly an upright position, leaning to the right hand, the motion will be form east to west; but if they lean to the left hand, their motion will be from west to east; and the nearer they are placed to an upright position the less will be their motion either way. If the tubes be placed on a sheet of glass, instead of moving towards the fire they will move from it, and about the axis in a contrary direction from what they did before; nay, they will recede from the fire, and move a little upwards when the plane inclines towards the fire."

SOME PROPERTIES OF GLASS.

"Glass resists the action of all acids except the 'fluoric.' It loses nothing in weight by use or age. It is more capable than all other substances of receiving the highest degree of polish. If melted seven times over and properly cooled in the furnace, it will receive a polish rivaling almost the diamond in brilliancy. It is capable of receiving the richest colors procured from gold or other metallic coloring, and will retain its original brilliancy of hue for ages. Medals, too, embedded in glass, can be made to retain forever their original purity and appearance.

"Another singular property of glass is shown in the fact, that when the furnace, as the workmen term it, is settled, the metal is perfectly plain and clear; but if by accident the metal becomes too cool to work, and the furnace heat requires to be raised, the glass, which had before remained in the open pots perfectly calm and plain, immediately becomes agitated or boiling. The glass rises in a mass of spongy matter and bubbles, and is rendered worthless. A change is how-effected by throwing a tumbler of water upon the metal, when the agitation immediately ceases, and the glass assumes its original quiet and clearness."

ANTIQUITY OF THE ART.

"All writers on the subject of glass manufacture fail to show anything decisive upon the precise period of its invention. Some suppose it to have been invented before the flood. Nervi traces its antiquity to the yet problematical time of Job.

"The first glass-houses, well authenticated, were erected in the city of Tyre. Modern writers upon the subject generally refer to Pliny in establishing the fact that the Phœnicians were the inventors of the art of glass-making. The tradition is that the art was originally brought to light under the following circumstances. A vessel being driven by a storm to take shelter at the mouth of the river Belus, the crew were obliged to remain there some length of time. In the process of cooking, a fire was made upon the ground, whereon was abundance of the herb 'kale.' That plant burning to ashes, the saline properties became incorporated with the sand. This causing vitrification, the compound now called glass was the result. The fact becoming known, the inhabitants of Tyre and Sidon essayed the work, and brought the new invention into practical use. This is the tradition: but modern science demonstrates the false philosophy, if not the incorrectness, of Pliny's account; and modern manufacturers will readily detect the error, from the impossibility of melting silex and soda by the heat necessary for the ordinary boiling purposes.

"It is a well-authenticated fact, however, that there were whole streets in Tyre entirely occupied by glass-works; and history makes no mention of any works of this character at an earlier period than the time mentioned by Pliny.

"It was during the reign of Nero, so far as we can discover, that the first perfectly clear glass, resem-

bling crystal, was manufactured. Pliny states that Nero, for two cups of ordinary size, with handles, gave six thousand sestertia, equal in our currency to about two hundred and fifty thousand dollars; and that rich articles of glass were in such general use among the wealthy Romans as almost to supersede articles of gold and silver.

"It is not strange that the strict secrecy with which the business was conducted in the Middle Ages should have invested the art with an air of romance; and legends, probably invented for the purpose, created a maximum of wonder among the uninitiated. The government of Venice also added, by its course, to the popular notions regarding the high mystery of the art, conferring, as it did, the title of 'Gentleman' (no idle title in those days) on all who became accomplished in the manufacture. Howell, in his 'Familiar Letters,' dated from Venice in 1621, says:—'Not without reason, it being a rare kind of knowledge and chemistry, to transmute the dull bodies of dust and sand, for they are the only ingredients, to such pellucid, dainty body as we see crystal glass is.'"

GENTLEMEN GLASS-BLOWERS.

"A French writer, who published an elaborate work in twelve books upon the subject of glass manufacture, after it had been introduced into France, gives an interesting account of the rise and progress of the art in that country, the encouragement it received, and the high estimation in which it was held. After stating that it was introduced in France from Venice, he says:—

"'The workmen who are employed in this noble art are gentlemen, for they admit none but such. They have obtained many large privileges, the principal whereof is to work themselves, without derogating from their nobility. Those who obtained these privileges first were gentlemen by birth; and their privilege running, that they may exercise this art without derogating from their nobility, as a sufficient proof of it, which has been confirmed by all our kings; and in all inquiries that have been made into counterfeit nobilities, never was any one attainted who enjoyed these privileges, having always maintained their honor down to their posterity.' Baron Von Lowhen states, in his 'Analysis of Nobility in its Origin,' that 'so useful were the glass-makers at one period in Venice, and so considerable the revenue accruing to the republic from their manufacture, that, to encourage the men engaged in it to remain in Murano, the Senate made them all Burgesses of Venice, and allowed nobles to marry their daughters; whereas, if a nobleman marries the daughter of any other tradesman, the issue is not reputed noble.'"

FARMERS' CLUB.

The Farmers' Club of the American Institute held its regular weekly meeting at its Room at the Cooper Institute, on Tuesday afternoon, Feb. 28, the President, N. C. Ely, Esq., in the chair. From the proceedings we select as usual such portions as we suppose will interest any considerable number of our readers.

A HYBRID OAK.

Professor David Christy presented the acorns and dried leaves of eleven species of American oaks. One of these was the Leana, and Professor Christy remarked that for a long time it was supposed that there was but one tree of the species in existence, but recently a second specimen had been found. It was suspected by botanists to be a hybrid product of the Black oak crossed with the Laurel oak, and this suspicion is now confirmed. A gentleman in Cincinnati planted the acorn, and the leaf of the young tree bears a much closer resemblance to that of the Black oak than it does to that of its parent Leana. As it is a general law that hybrids do not perpetuate their own kind, but tend constantly to return to one or the other of the parent species from which they were derived, it is now considered as settled by this experiment that the Leana is a hybrid.

ARTIFICIAL HONEY COMB.

Mr. Steel presented a specimen of pressed wax from Switzerland, where it is manufactured in large quantities for use in bee-hives, to guide the bees in the construction of their comb. In many kinds of hives it is desirable to have the comb constructed in parallel sheets, and in certain directions, and numerous plans have been tried to induce the bees to conform to this arrangement. The Swiss are probably in advance of all other nations in the management of the honey bee, and they have discovered an effectual method of guiding them in laying out their sheets of comb. A thin sheet of wax is pressed full of indentations corresponding in form to the base of the cells, and is then suspended from the top of the hive in the position at which it is desired the central sheet of comb should be built. Mr. Steel stated that this plan is perfectly successful, and that he had purchased, at considerable cost, one of the machines for pressing the wax, thinking there might be a demand for the article among our bee growers.

EFECT OF COAL ASHES ON WOOD ASHES.

Mr. Solon Robinson read a letter to the club saying that the writer had observed that the ashes of hard coal mixed with wood ashes entirely destroyed the value of the wood ashes for making soap. It would be interesting to have this statement tested by careful experiment.

Invention of the Revolving Horse-rake.

There seems to be many claimants for the honor of inventing this useful tool. We find the following letter in the *Rural New Yorker* :—

"I am well acquainted with Mr. Hunt, the principal claimant, as he formerly resided in Bridgewater, and was my neighbor for twenty years or more, and am perfectly familiar with the circumstances of the getting up of his rake. I also know that there is but little resemblance in appearance, and, in fact, none at all in the working of his rake, to the one now so generally in use. Hunt was a farmer and I a mechanic; between us we got up the rake for his own use as a farmer, but for which he obtained a patent, No. 104, Dec. 10, 1836, I making the first scratch on, and taking the last chip from the original one manufactured. Two years after, the rake now so extensively used in the Eastern, Middle, and Western States, was invented, in Bridgewater, by myself. When it was brought out, the one for which Hunt obtained a patent was cast aside, not one having been used for the last twenty years or more, I will venture to say. Let Mr. Hunt produce a drawing or description of his rake, to show how it will compare with the one now in use, and surely no sane man can call them nearer relatives than fifth cousins, unless, like Polonius, he is bound to see that the cloud looks 'very like a whale.' I can prove, by living witnesses, the statement above made, and also that my invention was recorded at the right time and place, though no patent as yet has been taken out for it.

"ALBERT BROCKNY.

"North Bridgewater, Oneida Co. N. Y., 1865."

Potash by the Cartload.

The Carson, California, *Post*, says,:—"Yesterday Asa Kennedy came into Carson with a load of potash collected from a bed of that material near the Sink of Carson, for Duff & Co's soap factory. Samples of the article had previously been sent in and tried, giving entire satisfaction. In other countries this article is the result of time and labor. Here a man has but to drive his team on to the bed and shovel up a load. The same is the case with salt, saltpetre, alum, sulphur, and numerous other articles that might be mentioned, useful in the arts and trade. Thus far almost every article, except coal, required for the reduction of our ores, is found in abundance within our own limits, or at least the material from which to manufacture it. Nature has certainly furnished our barren unsightly land, bountifully, and yet we have hardly looked into her resources. Future developments, we confidently believe, will show an abundance of coal, and possibly nature may have provided, somewhere in our monutains, springs of niter and sulphuric acid."

PREJUDICE AGAINST MACHINERY OVERCOME.—In the course of a speech made at a late meeting of a farmers' club in England, Lord Palmerston said:—"A few years since the flailmen thought that the thrashing machine would take the bread out of their mouths, and the thrashing machines were destroyed in consequence of this jealousy of the flailmen. The other day when I was down in Hertfordshire, I was told by a farmer that the laborers now considered the flail too severe an employment, and that they would not thrash with the flail, but only by machinery."

Correspondence

Material for Heavy Ordnance.

MESSRS. EDITORS:—In publishing my letter in the SCIENTIFIC AMERICAN of Jan. 9, on pages 19 and 20, you added a note in which you took exceptions to my statement that *cast iron* was *not the best* material for cannon, and added that "the problem in regard to the best material for heavy ordnance is not yet definitely solved."

In the number published Feb. 25, you have an editorial article on this subject in which you say that "Within a few years [past] the Russians and Prussians, and perhaps the English, have made a stride in advance of us. *This has been effected by the use of a better material than that which we employ.*"

It seems to me that this last admission or statement—especially when backed up by the recent failures of the Parrott and other cast-iron guns, by the report of the Senate Committee pronouncing them unsafe and unreliable, and recommending the substitution of Ames wrought-iron guns, and still more the testimony of the Ames gun itself on trial—ought to be, if not conclusive, at least tolerably satisfactory on this point.

In this matter, as in that of "breech-loaders," I have not the slightest pecuniary interest; but I do feel anxious that the Government should avail itself of every possible advantage by the adoption of the strongest and best weapons. W. C. DODGE.

Washington, D. C., Feb. 24, 1865.

To Stain Wood Black.

MESSRS. EDITORS:—Having seen in the last week's issue of your journal the answer to some one's query how to stain wood black, I take the liberty to send you a simple and very cheap black stain, which I have many times used. I take extract of logwood and put water enough with it to dissolve it, and heat boiling hot, and apply to the wood while hot some three or four times, letting each coat dry; then I give it a good coat of acetate of iron, which I make by putting vinegar upon iron chips. This produces a perfect jet black. GEO. W. BLISS.

Springfield, Mass., Feb. 27, 1865.

[Extract of logwood and acetate of iron mixed together make black ink. It may be better to make the ink in the wood than to make it first and then soak the wood in it. We suppose green vitriol—sulphate of iron—would answer as well as the acetate, and the extract of nutgalls, or of oak bark, or of sumac, as well as the extract of logwood.—EDS.

Shoe Blacking.

MESSRS. EDITORS:—Will you be so kind as to inform me, through the SCIENTIFIC AMERICAN, the different ingredients Mason's shoe blacking is composed of, and the relative proportions of the same? Also whether a mill is used for mixing the same?

S. T. F.

New Brunswick, Feb. 16, 1865.

[As a good blacking for shoes and boots is in universal request we give the following recipes. Whether "Mason's" is so made we cannot say.

Polish without friction.—Gum-arabic, 1 ounce; lump sugar, ½ ounce; ivory black, ½ ounce; water enough to make it easily applied with a sponge. Dissolve the sugar and gum, and grind the black on a slab with it. No friction required.

Paste Blacking.—Ivory black, 1 pound; molasses, 12 ounces; vitriol, 1 ounce; sweet oil, 2 ounces. Mix the black and molasses well; add the oil, and by degrees the acid; as much water afterward as may be thought necessary to give the proper consistency.—EDS.

Cast-iron Floating on Cast-iron.

MESSRS. EDITORS:—You will confer a great favor on a few of your subscribers in this place if you will inform us by what law of physics it is that a solid piece of iron will float on molten iron. Yea, more, if the solid piece be pushed to the bottom of a mass of molten iron it will rise to the top, like a piece of wood in water. At first, we thought its specific gravity was lighter, but then we found by experiment

that iron as it changed from a molten to a solid condition was contracted, and hence its specific gravity must be greater in a solid than in a molten form.

C. F. H.

Pekin, Ill., February 21, 1865.

[It is stated in the books that cast-iron expands in the act of hardening, and then shrinks as it cools to a smaller volume than it filled in the molten state. If this is correct solid cast-iron of very nearly the temperature of the molten metal would float on the latter, while if it were cold it would sink. The expansion is doubted by some good observers, and it is perhaps open to further investigation. Care should be taken that the solid iron should inclose no cinders, coals, or other substances of less specific gravity than iron. Many high authorities say that any metal, solid, will float upon a mass of the same metal melted. But Professor Everett, of this city, tells us that he made the experiment with lead a short time since, and if he used a bar containing no dross or other impurities it would invariably sink. Perhaps some of our correspondents will make the experiment in the same careful manner with other metals, and communicate the result.—Eds.

The Mechanical Problem Tried.

Messrs. Editors:—By way of settling the problem of "The Two Wheels" we have made the experiment.

The cylinders used were 2·35 inches diameter by 5 inches face, and precisely equal in weight. One was a disk of poplar 2·05 inches diameter, surrounded by a ring of brass, .15 inches thick. The other a disk, 2·35 in diameter, whose center was occupied by a cylinder of brass, in weight equaling the ring.

The inclined plane was at first the hypothenuse of a triangle, whose base and perpendicular were respectively 3 feet and 6 inches. It was afterward varied, and in some cases the horizontal plane was also elevated to various hights.

A simultaneous start was allowed, by placing the wheels against an edge and removing this quickly.

The result was in all cases the same. The wooden rim acquired a higher velocity. The relative motion of the wheels upon the horizontal plane was the reverse of that upon the inclined. On the inclined the wooden rim gained on the brass; on the horizontal, vice versa. The wheels reached the same relative positions, though not at the same time. In the first position of the inclined plane the brass rim was 12 to 14 inches behind when the wooden rim reached the horizontal.

If the wheels were free to slide down, their maximum momentum would be similar—the same weight by the same velocity. Being forced to revolve, gravity finds a reservoir in the center of oscillation. If this lies in the axis of rotation, the weight being condensed into a mathematical line, the case is the same as sliding down; the time of descent is then a minimum and the speed a maximum. In proportion as the center of oscillation is distant from the axis so does the time increase and the speed decrease. As the center of oscillation in the wooden rim is at a distance from the axis it takes longer to roll down than it would to slide. In the brass rim this is still more apparent.

The momentum of the wheels on reaching the horizontal are equal though compound, being expressed by velocity of axis multiplied by weight, added to velocity of center of oscillation multiplied by weight. To destroy both motions the resistance must act on a point between the axis and center of oscillation, the center of oscillation being taken in a diameter perpendicular to the inclined plane.

J. Burkitt Webb.

Bridgeton, N. J., Feb. 28, 1865.

A Demand for Small Inventions.

The following complimentary letter from Mr. Bleyer, whose engraving appeared on page 126, speaks for itself. It confirms our oft-repeated assertion that there is a great demand for small inventions:—

Messrs. Munn & Co.:—I received the box containing papers, model and engraving, in good order. I am much pleased with the engraving and accompanying description. Truly everything that is done through the Scientific American Patent Agency is well done.

Although well aware of the value of the Scientific American as a medium for introducing inventions, I had no true conception thereof, and find myself agreeably surprised at its influence in that direction. It is now a little over a week since the engraving appeared, and I am already "up to my elbows" among orders, etc., from all quarters. Your Agency will always receive the commendation of

Buffalo, Feb. 28, 1865. H. W. Bleyer.

Coppery Fruits and Vegetables.

The Analytical Sanitary Commission of the *Lancet* have just published a report on the presence of copper in articles of consumption, which reveals a very unsatisfactory and reprehensible state of things connected with the preservation of certain fruits and vegetables for winter use. It appears that the practice of "greening" with the poisonous salts of copper is still continued by many British and foreign houses, and that in one class of articles largely consumed in hotels and restaurants, viz.: peas and beans preserved in air-tight metallic cases, uncolored samples are but rarely met with. The principal salts of copper detected by the Commission were the acetate and the sulphate—the first having been probably formed by the action of the acetic acid in the vinegar used upon the copper of the vessels in which the pickles had been prepared, and the second, known as "blue stone," having been directly introduced into certain articles preserved without vinegar.

Of thirty samples of peas and beans and mixed vegetables preserved in tin cases, twenty-five were found to contain copper, generally in the form of sulphate. The five samples found to be genuine and of the natural color, were the peas obtained from Lazenby & Son, labelled "John McCall & Co.;" from Ball & Son, labelled "Thre. Rolland;" and both the peas and beans procured from Crosse & Blackwell, labelled respectively "Phillippe and Canaud," and "Thre. Rolland, au Mans."

Of nine samples of pickles tested, five contained acetate of copper, and four were entirely free from that salt. The uncolored samples were French beans and gherkins, from Burgess & Son; and mixed pickles and gherkins from Crosse & Blackwell.

Of the three samples of bottled fruits examined, all contained copper, most probably the sulphate.

Some idea of the enormous consumption of pickles and preserved vegetables of different kinds, and consequently of the importance of the presence or absence of copper, may be gathered from the following statistics of the sales of a large firm in the year 1864: Pickles, 216,000 gallons, of which 104,000 consisted of gherkins, beans and cucumbers; West India pickles, and sold as imported, 2,800 gallons. Bottled fruits for tarts, 35,000 dozen quart bottles, of which 17,000 dozen consisted of gooseberries, greengages, plums and rhubarb. Philippe & Canaud's peas and beans: peas, 10,600 tins; beans, 1,700 tins.

We are grateful to the Analytical Sanitary Commission for the information they have supplied, but we cannot help thinking that the adulteration of each sample ought to have been more precisely defined. Such expressions as "very much copper" and "rather much copper" are too vague for an important analytical report. The tests relied upon were: the bluish color of the ash when entirely freed from carbon, the blue color obtained with ammonia, and the deposition of pure metallic copper on a polished iron rod placed in an acid solution of the ash. As qualitative tests these are highly characteristic, but as quantitative tests they are useless.—*London Chemist and Druggist.*

Covering old Bed-quilts.

Now that cotton is scarce and high, it seems more than ever necessary that old bed-quilts should be saved to cover, line and quilt over again. After being well cleansed in two or three warm suds in a pounding barrel and rinsed, hang up to dry till ready to iron smoothly. When ready to quilt, first tack your lining to four quilt frames so that it will be smooth; then spread on the old quilt and baste fast to the lining or frames; over this spread the outside, and fasten the edges, having all parts smooth. The cotton is kept in place by the quilting in the old quilt. It is not necessary to put as much work on the new quilt. A lady who quilted one thus, about three inches apart, put it on, quilted, took it off and bound it in two days, doing all the work herself except assistance in rolling. And she had a thicker, warmer quilt than the old one

MISCELLANEOUS SUMMARY.

Communication with San Francisco direct.—On Sunday morning at three o'clock the wires of the Western Union Company were connected with the Pacific lines and communication established direct between this city and San Francisco. Though the weather was bad, rain falling at the time at many points on the route, the wires worked well, and a considerable amount of business was transacted. The distance is nearly four thousand miles, and the difference of time about four hours. This is unquestionably the longest circuit ever worked, and the fact that such length of wire was telegraphed over in one circuit is a notable era in the history of telegraphing.

Launched Ready for Sea.—A new screw steamer was launched, complete in every detail except her armament, from the shipyard of Mr. Donald McKay at East Boston on Wednesday afternoon. She is named the Yucca, is 145 feet long, 24 wide, and 11½ deep, with 12 inches dead rise at half floor. Her cylinder is 33 inches in diameter, with 30 inches stroke, applied to a propeller 9 feet in diameter, with 4 blades and 16 feet pitch. It is expected that she will steam from 12 to 14 knots in smooth water. It is not usual to launch vessels in this way, though in some instances it is done where time is an object.

The experiments now being made at the Clinton paper-mills, Steubenville, N. Y., to manufacture printing paper from corn husks, by the Austrian patent, are progressing very favorably. The pulp produced from the husks is as white as the driven snow, and said to be equal in appearance to pulp made from cotton or linen rags.

The Russian Serfs.—The London *Morning Star* says, that while the Russian serfs before emancipation were calculated to have consumed about eighteen shillings worth of cotton goods per head, that amount has already risen to one pound seven shillings per head over the 22,000,000 of emancipated peasantry.

It is a curious feature of the recent general election in Australia, that female householders voted, the new electoral act having conferred the franchise on them without intending it. The Melbourne papers say that the ladies exercised their new privilege with dignity and discretion.

A recent order of the War Department directs the issuing of a ration of fish, namely, fourteen ounces of dried fish, or eighteen ounces of pickled fish, to be made to the troops once a week, in lieu of the rations of fresh beef.

In France the fancy for collecting postage stamps has been called "Timbromania." The word seems to have given umbrage to the fair collectors of these curiosities, and the word to be used in future is "Timbrophilee."

R. K. Abbot, of West Concord, N. H., is drawing wood upon a sled with wooden runners, the forward set made 40 years ago, and the hinder one 35, and in constant use every winter since.

They have on exhibition at a Workingman's Association in London, an alarm clock which, on striking the hour appointed, lights a lamp and boils a pot of coffee or tea while the workman is dressing.

Rimmel, a prominent London perfumer, has published a treatise on odors and perfumes, and one original feature of the book is, that a delightful fragrance is perceptible in the binding.

Patent Law in Liberia.—The Legislature of Liberia, which adjourned on the 2d of January, passed during the session a patent law. The fees for citizens are $25; for aliens $50.

A factory in Boston has a calliope through which the escaping steam plays a cheerful tune to call the workmen together.

The total amount of fractional currency in circulation up to Saturday last was $87,288,300.

The corporations in Newburyport have a million and a half yards of cotton cloth on hand.

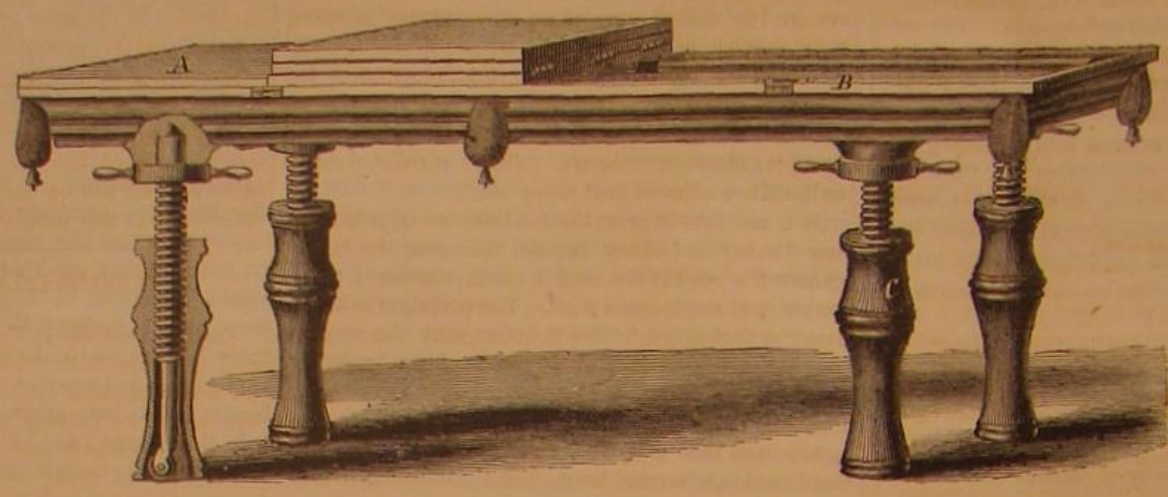
Cotton has fallen nearly fifty per cent, and there is a marked decline in cotton fabrics.

The cube of the diameter of a sphere multiplied by ·5236 will give the solid contents.

The consumption of ice in Philadelphia last year was one hundred thousand tuns.

Combination Billiard and Office Table.

This table is intended to do duty as a billiard table or as a table for any other purpose, to afford the lovers of this agreeable and innocent amusement the means of gratifying their tastes at their own homes at a comparatively trifling expense, and be available for domestic uses as well. The bed and cushions are the same as those on the ordinary billiard tables; it is, in addition, fitted with a removable cover, A: the frame of the tube, B, made of wood or iron is not so deep, but is more compact and quite as strong as the old billiard table; economizing space enough thereby to enable persons to sit at the table with their knees under it without having the table higher than the ordinary house table. By means of the screw in the adjustable leg, C, the casters are drawn up and the table made to stand solid, and at the same time the table is elevated to the required hight for the purposes of the game, and leveled by the spirit levels in the sides of the frame. The table is thus converted into a billiard table by raising and leveling it and removing the cover, A. The table will be manufactured of different sizes, varying from the French carom down to Phelan's smallest table, which will be found the appropriate size for home use, both carom and with pockets in the corners. Manufacturers wanted in all the large cities. For further information address J. D. Bradley, No. 315 G street, Washington, D. C.



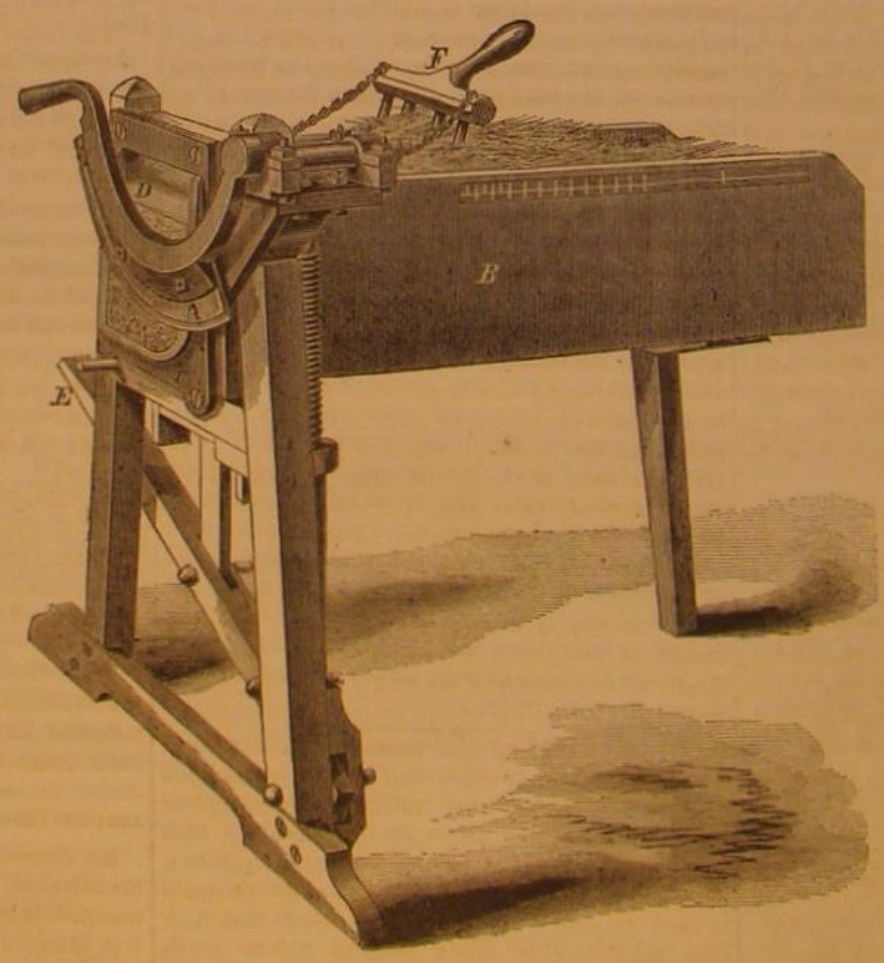
BRADLEY'S COMBINATION BILLIARD AND OFFICE TABLE.

Improved Hay Cutter.

Chopped feed is found to be more easily digested, and consequently healthier for stock than hay in bulk, and many ingenious machines have been contrived to cut up the hay with the expenditure of the least time and power. The engraving published herewith illustrates a hay cutter which is easily operated and claimed by the inventor to be exceedingly efficient. The novel features consist in the attachment of the knife, A, with reference to the feed trough, B. This trough is provided with an iron plate, C, against which the knife works closely, thus forming a shearing edge which very much assists in severing the hay. As the cutting edges wear provision is made for moving the knife back so that it always works closely against the iron plate. The material to be cut is confined by the clamp, D, which is worked by the treadle, E, and the fork, F, is convenient for distributing the hay evenly before being operated on. This machine is also useful for cutting tobacco or other substances that require to be shred finely.

The inventor says:—"The advantages of a spring treadle are very great, and the utility, durability and cheapness of the Nonpareil Feed Cutter meets the wants of those who wish to save time, money and labor. This machine cuts the feed to any length required, without choking or slipping over it. The inner face of the knife being slightly concave, causes less friction and permits the edge of the knife to whet itself against the flange of the mouth plate, thereby giving it a keener edge."

Patented on the 13th of December, 1864, by Jacob Doerksen, of Derry Church, Pa. The entire right is for sale on very liberal terms. For further information address H. A. Earhart, Palmyra, Lebanon Co., Pa. All persons writing after the 1st of April next, should send their letters to Elizabethtown, Lancaster Co., Pa.



DOERKSEN'S NONPAREIL HAY CUTTER.

HOT-BEDS.

It is the season of the year for making hot-beds, and thousands of mechanics who cultivate gardens would doubtless employ this means of enjoying the luxury of early tomatoes and cabbages if they knew how simply and easily a hot-bed can be made. The foundation is a bed of horse manure, two or two and a half feet deep, and of any desired size, say five by eight feet. Four rough boards are nailed together to form a box, without top or bottom, and somewhat smaller than the bed of manure, say four by six feet. This is placed on the manure bed, filled with good soil to the depth of six inches, and covered with window glass. The box should be made sloping toward the south, the north side about fifteen inches in hight and the south side about eight inches. It is better to have the sash made with bars running only one way across the box, and rabbeted so that the panes of glass may be laid on in the manner of shingles; but any old window sash will answer the purpose.

If the manure is very dry it should be well sprinkled with water as it is piled. In two or three days the soil will become warm, when the seeds may be planted, and it is surprising with what vigor they will sprout and grow. In hot days the sash should be raised a little at one edge; the soil should be frequently watered and kept free from weeds. If a man once tries a hot-bed he is not likely to dispense with it afterward.

The Cashmere Goat.

Israel S. Diehl, Esq., late United States Consul at Batavia, communicates to the Report of the Agricultural Department a long article on the goat, from which we extract the following:—

"This variety of the wool-bearing or 'shawl goat,' as it is often called, is spread over Thibet, Northern India and the regions to the east of the Caspian sea. It is somewhat smaller than the common and Angora goat; it has straight, round, pointed horns, pendant ears, is covered with straight and falling, long, fine, flat, silky hair, with an undercoat in winter of a delicate greenish wool, of but two to three ounces to each, which latter alone constitutes the fabric from which the celebrated shawls are made. Ten goats only furnish wool enough for a shawl one yard and a half square; but even this is often found differing both in color and the quality of the wool, or rather the fine hair of which the fleece is composed. The principal points in the most approved breeds are large ears, the limbs slender and cleanly formed, the *horns not spirally twisted*, and, above all, the fleece being long, straight, fleecy and white.

"Besides the true Cashmere and Thibetian breed from which originally the celebrated Cashmere shawls were made, there are several others which have been employed for the same purpose in different parts of Thibet, India and Tartary. The Tartar half-breed has been found to survive well in a colder climate, and has been introduced into France with considerable success, as also those from the Ghengis and Caspian.

"The shawls still most in request, however, are brought from the Kuyam of Cashmere, where 16,000 looms are constantly at work, employing three men to each, manufacturing and disposing of thirty thousand shawls annually.

"Hodgson, in speaking of this goat, alludes to it as 'a variety of the common domestic goat, known as shawl goat, of Thibet and Cashmere, and they are called, including its relative, the goat of Angora.' 'From earliest time the hair or fine under-down of this goat has been used in the manufacture of tissues or textile fabrics, especially in Eastern Europe and Western Asia,'

"The long-eared Syrian goat, to judge from the specimens we have seen, is only a variety of the Thibetian and Angora breeds, having long hair, with a fine under-coat like the former, but neither so abundant nor so fine as the Angora. In ancient times, when the goat divided the palm of usefulness with the sheep, the Syrian goat was no doubt superior to what we now find it in Palestine or Syria, so far as its hairy produce is concerned."

ANTIMONY VERSUS PETROLEUM.—A company engaged recently in boring for oil in Wirt county, West Virginia, struck a rich vein of antimony, a rare and expensive metal, in great demand for type-casting. The sum of $350 per tun was at once offered for all the discoverers could supply, and at these rates their profits will rival those of the silver mines of Washoe, and the oil wells of Venango.—*Pittsburg Chronicle.*

CHICAGO pays $100,000 a year for hand labor in grain shoveling. It is now proposed to save time and labor by employing machinery for this work.

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VOL. XII. NO. 11...[NEW SERIES.]....*Twentieth Year.*

NEW YORK, SATURDAY, MARCH 11, 1865.

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BORING STEAM CYLINDERS.

It is not surprising that the early makers of steam engines advanced slowly in constructing machines of great size, from the supposed impossibility of boring the cylinders when over certain diameters. Indeed, it is but comparatively few years since a cylinder of forty inches diameter was looked upon with as much respect as those of eight and nine feet in the bore now are. Until within fifteen years most of our large marine engine shops bored all their cylinders in lathes. This was the universal practice at that day, and until the vertical boring mill was erected the cylinders of steam engines were of a limited size and length of stroke, and were duplicated in order to get the requisite power for large vessels. Few double engines are built in this country at the present day, except those for screw propellers, compared to the number turned out formerly when steam cylinders were small and difficult to make.

All large cylinders are now bored in vertical mills. It is to this that they owe their rotundity, their exactness from end to end, and their uniformity of surface. But if any person imagines that a steam cylinder is as smooth when first bored as it becomes by wear, he is mistaken.

The finish imparted by the contact of two metallic surfaces moving in right lines under steam pressure is of a peculiar nature, and can not be imitated by any manipulation whatsoever. It is impossible to leave the interior of a steam cylinder in a condition approximating to the surface it acquires by working, and we, therefore, find in our large shops, where some of the best work is done, that no attempt is made to produce what might be called a dead smooth surface, but that the cutters are so ground as to engage with the metal as little as possible, or, in other words, to take light chips. So long as no palpable ridges are actually left, and the tool cuts, instead of tearing, the surface of the cylinders will be sufficiently smooth. It is also much more likely to be round and true where the tools cut free, instead of dragging. Many engineers declare that they prefer, of two evils, that the cylinder should be too rough rather than too smooth. In the first instance the packing rings suffer for a day or two until the surfaces have found a bearing; the ridges becoming filled with grease in the interim conduce not only to ease of motion but to the production of a true surface, and prevent cutting. With the cylinder bored too smooth at first scratching is more probable; from the intimate relation of the rings and the piston the tendency to tear away before they have been polished by wear is much increased.

Let us remark here that a cylinder or valve face once well polished by wear under pressure acquires a vitreous film, which resists a file or scraper; when it is once injured by cutting no such surface will form again until the cutting be stopped, and the two clean surfaces well lubricated are brought together again.

Steam cylinders are now of dimensions formerly unknown. The cylinders of the new Pacific mail steamers are 105 inches diameter; those of the *Achilles*, English iron-clad, are 112 inches, and Ericsson's hot-air engine, built some years ago, had cylinders 168 inches in diameter. To bore a cylinder 105 inches diameter face, both flanges and recess for the head, occupies about 200 hours. About three-eighths of an inch are allowed for boring out.

It is a common practice to bore small cylinders, say twenty or thirty inches diameter, in lathes. Where the head is not cast in, as it commonly is for screw engines, a cross is often inserted and the boring bar run through it. This is not a good plan, for the bar is apt to be cramped or bind in the cross and produce bad work. The better way is to have a large and stiff bar—the shorter the better—put in good tools that cut, and a slow speed and moderate feed kept on continuously until the work is done. Any intermission will make an inaccuracy in the bore, for even where no heating takes place, when the cutters are started from a state of rest they spring into the iron and make a ridge. A multiplicity of cutters is better than one. Three, at equal distances apart, work well, and if the cut is divided, each one working slightly behind the other, a good working face in the interior will be secured.

Grinding a cylinder with emery is the last absurdity any one conversant with steam machinery would suggest. It used to be done in old times, when slide valves were ground, but the two abuses have gone out of practice together.

PROFESSOR BOWEN ON THE CURRENCY.

Professor Francis Bowen, of Harvard University, the author of perhaps the most learned work on Political Economy ever written, has published a plan for restoring our currency, essentially the same as that proposed by us last December. It will be remembered that we advocated the funding of $200,000,000, of the legal tender government notes by the sale of a corresponding amount of interest bearing bonds. The only difference between our plan and that suggested by Professor Bowen is, that while we would effect the change just as rapidly as the bonds could be sold, he would make it a gradual operation, extending over several months. Our respect for the opinion of Professor Bowen has led us to reconsider this point with all the earnestness and candor of which we are capable, but this reconsideration has only strengthened our conviction that it would be best to make the reform as quick in its action as possible. All the beneficial effects of the reform on the revenues both of the Government and the people would certainly be as great if it were prompt as if it were slow in its consummation, while the evils inseparable from so great a change in the business and life of the nation, it seems to us would be immeasurably less if the reform were made at a blow, than if it should be brought about by a lingering operation. Nearly all business men, especially those engaged in trade, would prefer a sudden to a slow reduction in prices. A prompt return to specie payments would make the nominal value of their stocks one half the amount that it is now reckoned, but it would place them in a position to go on in their business with absolute safety and certainty in their calculations. On the other hand, a gradual decline in prices would compel our merchants to sell their goods at cost or less, and thus to be doing business without profit throughout the period the reform was being effected.

It has been urged by the *Evening Post*, a paper that usually displays the greatest intelligence and ability in the discussion of financial questions, that any contraction of the government currency will be counterbalanced by a corresponding expansion in the currency of the national banks. But the notes of these banks are not merely redeemable by act of Congress in lawful money; their redemption is practically enforced by our clearing houses. Lawful money at the present time is government currency, and this money is now the basis of the bank circulation, the same as was gold in the good old days of specie payments. The bank note circulation has expanded with the expansion of its basis, and it would necessarily contract with the contraction of its basis. A withdrawal, therefore, of a portion of the government currency, so far from being counterbalanced by a corresponding expansion of the bank note circulation would be accompanied by a contraction of that circulation in the same proportion.

It is, however, probable that the discussion is of no practical importance, for, if the announcement be officially made, in such manner as to be believed by the community, that the currency is to be reduced to the specie standard, the effect on the prices of gold and other articles will be anticipated, and the fall will be as prompt as any parties can desire.

IMPREGNABLE SHIPS OF WAR.

Captain Cowper P. Coles, the principal exponent and advocate in England of the only correct system for iron-clad ships—the monitor system—has written a letter to the London *Times* in which he expatiates upon the value of our iron-clads, and the general superiority of them, or the principle they represent, over those adopted by the English naval authorities. In relation to the monitors especially, their capacity to carry heavy guns in proportion to their tunnage and thickness of armor, Captain Coles says:—

"The smaller monitors are 1,034, and the *Monadnock*, although only 1,564 tuns, Admiral Porter says would destroy any vessel we have in the British navy. In this I cannot agree with the gallant Admiral—for I believe the *Royal Sovereign*, though but a conversion, if she had proper guns supplied to her, would be a good match for the *Monadnock*. On both sides of the water it appears to be now admitted that in the actual fight of ship against ship, the turret vessel must have great superiority.

"Our larger ships run up to 6,000 tuns, and we have no iron-clads approaching so small a tunnage as these monitors, except the *Research* and *Enterprise* (broadside vessels), which have not yet been tried in a gale of wind, and cannot attempt to carry their heavy guns."

The *Royal Sovereign*, alluded to by Captain Coles, is a turret vessel, and has been laid up and dismantled by the Admiralty Board. The same class which opposed the monitor system in this country and were defeated, have had better success in England, and, despite the representations and arguments of the leading mechanical journals abroad, have procured their suspension from service, and caused them to be laid on one side. Admiral Porter remarked in his official report that he would rather be on a wooden vessel and take what comes than be shut up in a monitor turret. To this Captain Coles tersely responds by saying:—"The gallant Admiral would have a better chance of telling his tale after fighting behind ten inches of iron in a turret than three feet of wood."

On this side of the water there have been two systems of iron-clads thoroughly tried—the broadside and the turret. The broadsides have been repeatedly smashed, broken in, boarded, and captured. Not a turret vessel has ever been penetrated or captured.

From the *Galena*, our first crude experiment, to the *Tennessee*, the last and best vessel of the Confederates, all have met a like fate, and not one floats that dares venture within range of a monitor.

Improvement in Manufacturing Lumber.

Mr. Pearson Crosby, formerly of Fredonia, now of Brooklyn, N. Y., has for the last thirty years been engaged on inventions relating to sawing machinery, and obtained as the result of his ingenuity nearly twenty patents, as well as tangible pecuniary compensation.

By lumber manufacturers Mr. Crosby's improvements are highly valued, and the largest manufacturers of lumber in this country, Messrs. Phelps, Dodge & Co., certify that the capacity of their mills has been greatly increased by the adoption of Crosby's plans. Those interested in this branch of industry should read the advertisement of Mr. Crosby on another page.

TRANSPLANTING TREES.

In the course of the next two months many hundreds of thousands of trees will be transplanted from nurseries to orchards, most of them paid for at unusually high prices in the hope of obtaining remarkably luscious and valuable fruit. Some of the men who set orchards will lose from a quarter to a half of their trees, while others will lose hardly one in a hundred. A plan of setting, which will invariably give satisfactory results, is the following.—

After the ground has been richly manured and deeply pulverized, dig the holes of ample size to receive the roots in their natural position without bending. Then pour two pailfuls of water into the hole, and immediately begin to shake fine soil from a shovel into the water, continuing the operation gradually and steadily till the hole is filled. The hole should be filled around the outside in advance of the middle, in order to push the water inward to receive the earth about the central roots.

Fine earth gradually shaken into water in this manner is evenly deposited about the roots, surrounding and packing them as perfectly as if they had grown in their new position. This method of transplanting not only ensures the life and growth of the tree, but it is also easier than any other, and it further effects the very material economy of dispensing with the necessity of staking, the water settling the ground around the roots so closely as to hold the tree with sufficient firmness without any stakes. The tree, before it is set, should always be pruned of a part of its top, to balance the large portion of roots that are cut off in taking it up. If this be neglected, large parts of the branches will surely die, and there is great danger of losing the whole tree.

It is an excellent plan to mulch all orchards, and especially those newly set. The ground should be covered with the cheapest straw or hay to be had to the depth of four or five inches. This will not merely prevent the growth of weeds or grass, it will keep the soil both light and moist. If not mulched, it should be frequently stirred and kept clear from weeds. It is impossible to protect the roots of trees too carefully from exposure to the sun and air during their transfer from the nursery to the orchard.

END OF THE GOODYEAR EXTENSION CASE.

Congress has adjourned without passing an act to extend the patent of Charles Goodyear for the vulcanization of india-rubber, and as the patent expires on the 15th of June next, before another session of Congress, its fate may be regarded as sealed. It is stated that large amounts of money have been expended by those interested in the patent to procure its extension, and it is a matter of public congratulation that the end sought was not accomplished. Let all laws be general in their operation. There is nothing in which the great public have a more universal interest than the defeat of all schemes which seek to enrich individuals or combinations by special acts of legislation.

Undying Plants.

A letter from Guaymas, Sonora, Mexico, says:—"Passing on beyond Aribechi about two miles, we struck the bed of a stream through which we commenced our progress to another range of mountains whose slopes came down to the very edge of the channel way. It was here that we found the north sides of rocks which faced the stream covered with what at first seemed to be the most exquisitely beautiful green mosses that ever decked the rugged sides of a mountain. The entire sides of the mountain at this spot were blooming in the liveliest green. We dismounted to pluck some of these plants, and found that they were not strictly mosses, though undoubtedly they belong to that class of plants. Each one had separate roots firmly holding it to the rocks, and from these roots grew out a plant that opened to the diameter of a common tea-cup or a saucer, and spread itself flat on the face of the rock. The leaf somewhat resembles in texture the *arbor vitæ*. These plants bear the name of *siempre viva*—always living, or always alive. Their peculiarity is to come out into beautiful green life in the rainy season, and then, when all moisture has deserted them, to turn as brown as autumn leaves, and roll or curl themselves up like a ball, as uninteresting to see as a brown stone, seemingly dead. But with the return of moisture, they uncurl their leaves and spread out again as beautiful and green as ever. Another peculiarity of the plant is that you may pluck it, throw it into your saddlebags, and keep it six months, and then place the roots in a cup or saucer of water when you retire for the night, and in the morning you will find by your side a lively green plant. It looks like magic. But I have tried it to my surprise and delight. The plant never dies—its life is immortal; and its beauty of texture and form and color are renewed or continue with the continued supply of moisture."

Cost of a Gun Barrel Spoiled in Grinding.

The barrel-grinders at the water shops in the Springfield Armory all gave their two week's notice of quitting a few days ago. They had to pay $1.70 to the Government for every barrel they spoil in grinding, but lately ascertained that the authorities, on account of the large number of barrels spoiled in going through this process, had raised the sum to $2.78, this change to take effect from the first of January. The workmen claim that this is unreasonable, inasmuch as the quality of the stock which has been used of late is much poorer than formerly, and that this and not their carelessness is in fault. If the disagreement is not adjusted some difficulty may be found in filling the places of the "strikers," as the job is by no means an easy one to learn, while it is notoriously unhealthy. There are now about three hundred and thirty thousand muskets at the arsenal. No shipment of arms has been made for several weeks, and there is no immediate prospect of any.—*Springfield Republican.*

Heavy Rolled Iron.

The Phenix Iron Works have a heavy contract for the United States to furnish iron for iron-clad steamers. They roll eight inch square and twenty-four feet long, weighing about two tuns and a half, of the best iron. The like of this has never been done in this country. Each piece is perfectly straight, square and smooth. Heretofore the Government had its heavy iron forged. These works are in complete order for this kind of work; the gearings and fixtures are admirably arranged and in perfect order. This mass of iron, after it is heated, is drawn out of the furnace to the rolls, and after it has passed through the rolls several times, it is then drawn away to a saw and an end cut off, when it is straightened under a powerful screw press, and then drawn away to cool.

Spring Bed.

By referring to this week's report of the patents issued at the Patent Office, it will be seen that G. W. Mitchell, of St. Louis, Missouri, has secured a patent for valuable improvements in spring beds. We have no hesitation in saying that it is a good improvement. The bed is simple, cheaply constructed, and durable, and dispenses with the heavy, cumbersome wood frame which is necessarily used in the old style spring beds. It is easily and quickly taken apart for the convenience of transportation, for carrying into small apartments, killing bugs, etc. The mattress which covers the springs forms part of the patent claims, and is filled on the sides and ends, and is attached to the slats by buttons and holes. When all together it presents a complete and beautiful bed.—[See his advertisement in another column.

Reduction in the Caliber of Infantry Arms.

The board now in session at Springfield for the examination of small arms, have decided to reduce the caliber from 58-100ths and 54-100ths to 50-100ths of an inch, which diminishes the weight of the ball one-third, and reduces somewhat the weight of the gun.

STRAWBERRIES.—We notice strawberries in the windows of our Broadway saloons placarded $5 per basket. These baskets are about the size of a common tumbler, or half a pint, so that the fruit costs only $20 per quart. Six strawberries raised in Fitchburg were recently sold for a large dinner party in this city for $2.50. The six just filled one basket.

NEW THREE CENT COINS.—A law was passed by both houses of Congress during the closing hours to authorize the coinage of three cent pieces to be composed of copper and nickel.



ISSUED FROM THE UNITED STATES PATENT-OFFICE
FOR THE WEEK ENDING FEBRUARY 28, 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.

46,537.—Cultivator.—Wm. Bankson, Mt. Pleasant, Iowa:

I claim the frame, F F, the lever, L, the suspension of the plows, 3 and 4, on bar, X, and the moving of them with the lever, N, when constructed substantially as described and for the purpose set forth.

46,538.—Lamp.—Wm. W. Batchelder, New York City:

I claim the combination of the safety or controlling devices herein described, with a lamp constructed and operating as herein described.

Second, The combination of the controlling conical screw, E g, with the cap, B, tube, C i, and lamp reservoir, A, all constructed and operating in the manner and for the purpose substantially as described.

46,539.—Padlock.—Wilson Bohannan, New York City:

I claim, first, So constructing a padlock that in the act of closing the shackle, B, this latter will release the hooked plate, d', from a toothed pawl, b, previously to locking, and still act upon the said plates, substantially as described.

Second, Receiving the hook, d, on the catch plate, d', in the act of closing the shackle, B upon the nose of this shackle, after said plate is released from the tooth, j, of pawl, b, substantially as described.

Third, So constructing the teeth, i j, on the pivoted plates, d' and b, that in the act of closing the shackle the latter will force the hook, d, backward, to receive the nose, c, substantially as described.

Fourth, The combination of the shackle, B, with its slotted nose and lever tooth spring pawl, b, with its tooth, j, catch plate, d', with its hook, d, and tooth, i, and the slotted tumbler or tumblers, g g', all arranged and operating substantially as described.

46,540.—Corn Sheller.—Jacob Brinkerhoff, Auburn, N. Y.:

I claim the bed piece, M, constructed as and for the purpose herein set forth.

46,541.—Fence.—Marcus Brown, Fond du Lac, Wis., and Oscar J. Shannon, Fairwater, Wis.:

First, We claim constructing a fence with posts having bevels, d d,, substantially as and for the purpose set forth.

Second, We claim the bands, c, or their equivalent, in combination with bevelled posts, a a', substantially as and for the purpose set forth.

46,542.—Signal Box for Fire Alarms.—Charles E. Carpenter, Providence, R. I.:

I claim a signal box, provided with an aperture to admit the finger, and having a diaphragm of paper or other suitable material extended across the inner mouth of the aperture, the position of the diaphragm being such that the signal knob or lever cannot be moved without breaking the paper.

46,543.—Apparatus for Making Tags.—James B. Clark, Plantsville, Conn.:

First, I claim the combination of the plates, y y and t t, substantially as herein described, for the purposes set forth.

Second, I claim the combination and arrangement of the punch, H, and plate, x, over which the folds of the tag are made, substantially as described and for the purpose set forth.

46,544.—Seeding Machine.—Stephen D. Cook, Lima, Mich., and Henry J. Webb, Dexter, Mich.:

We claim the employment of the rake, R, in combination with the "Shaking and Oscillating Seed-distributing Trough," T, operated substantially as and for the purposes specified.

46,545.—File-cutting Machine.—John D. Crocker, Norwich, Conn.:

I claim, first, The combination of the oscillating table which carries the file blanks, and gearing substantially such as described, so that the operation of cutting the teeth or burrs on the blanks may proceed both as the carriage is fed forward and backward, as set forth

Second, The combination of the contrivance, F, with oscillating bed, A', and reciprocating bed, A, substantially as and for the purpose described.

Third, Extending one end of the feed screw shaft, B, beyond the end of the bed, A', so as to constitute a handle, B', for enabling the operator to adjust the bed, A', longitudinally or laterally, at pleasure, substantially as described.

Fourth, Constructing the hammer with a concave face, in combination with a chisel stock, which is susceptible of being adjusted and set at different angles, substantially as described.

Fifth, So constructing a file machine that its file-supporting carriage can be adjusted after it has moved forward, to be fed backward, and during both of said movements the operation of cutting teeth or burrs on file blanks is performed, substantially as set forth.

Sixth, Cutting and setting file teeth or burrs on blanks, by means of a machine, which is constructed and operates substantially as herein described.

Seventh, Applying the chisel stock guide, J2, to a vertically adjustable slide or support, L, substantially as described.

Eighth, The chisel stock holder, J2, constructed to slide and swing, and also to guide and support the chisel, substantially in the manner described.

Ninth, Providing for adjusting the chisel to cut toward the operator, both in the forward and backward feed of the file carriage, substantially as and for the purpose described.

46,546.—Machine for Amalgamating Gold and Silver.—Augustine B. Crosby, Boston, Mass.:

I claim the application and use of copper plate or plates of any material placed at an inclination within the body of quicksilver.

I claim the application of a proportion of two or more of submerged copper or other plates to one slot of the slotted diaphragm, so as to produce an alternate action on each plate of the material passing through.

I claim the combination of A B C D E F and G, and of the several figures of the drawing, or any combination of them, for similar purposes.

I claim the application of one or more redivisions of the gold or other metal-bearing material in its passage through the quicksilver, in substantially the manner shown by the drawing.

I claim the application of copper or other metal amalgamated plates, in lattice arrangement, with or without riffles, as shown at J and M, of Fig. 1, substantially the same.

I claim the combination, or any similar one, of the parts shown in the drawings by the letters J K L M N and O.

I claim the general combination of all the above described parts, as shown by Fig. 2, or any similar one for the same purpose.

46,547.—Clover Harvester.—Frederick Decker, Ostrander, Ohio:

I claim the described combination of the knife, P, fingers, H, stripper, F G, and reel, L, all constructed and employed as and for the purposes specified.

46,548.—Stave Machine.—C. J. Dibble, Farmington, Iowa :

I claim, first, Giving an intermittent feed motion to rollers, c c, for feeding the block up to the work, by means of a spur, s, actuating a gage wheel, B3, on the pinion shaft, B', substantially as described.

Second, The combination of a pointed projection, p, on carriage, B, with the spurred slide, H, substantially as described.

Fourth, The combination of the spurred feed rollers, applied to head block, B2 B2, on carriage B, with the bevel wheels, b' b' b b, shaft, B', and gage wheel, B3, operating substantially as described.

46,549.—Manufacture of Iron and Steel directly from the Ore.—Charles M. Dupuy, New York City:

I claim the combination of desulphurizing, etc., and oxydizing, as herein set forth, with the process of deoxydizing, substantially and for the purposes specified.

I also claim the combination of the desulphurizing and deodorizing and carbonizing processes in the manufacture of steel, as described.

I also claim the combination of the desulphurizing and deoxydizing processes with the welding furnace, by which iron is manufactured at a low degree of heat, as set forth.

46,550.—Wheel Cultivator.—A. P. Durant and D. M. Buckley, Atlanta, Ill.:

We claim the plow frame, B B, when arranged under the main frame in front of the axletree, and the power applied directly thereto, and when attached, adjusted and operated in relation to the main frame, substantially as set forth.

46,551.—Lubricant for Wool.—Benj. A. Earl, Philadelphia, Pa.:

I claim the use of a combination of milk and borax as a lubricant.

46,552.—Machine for Pouncing and Napping Hat Bodies.—Rudolph Eickemeyer, Yonkers, N. Y.:

First, I claim attaching the pouncing and rubbing surfaces to a roller, or its equivalent, which has a movement upon a track or tracks, or pattern, parallel with the longitudinal profile of the rotating block upon which the hat is stretched, substantially as herein described.

Second, So applying and operating the shaft of the rotating hat block, and the roller, or its equivalent, to which the pouncing or rubbing surface is attached, that the one has a transverse motion relatively to the other, substantially as herein specified.

Third, The interposition of a cushion, l', of india-rubber or other elastic material, between the sand paper, l, and felt, u, or other pouncing and smoothing material, and the roller, J, or its equivalent to which such materials are attached, substantially as and for the purpose herein specified.

Fourth, A device for stretching the hat body upon the block, consisting of a system of hooks, all connected with disks, G, and F, or their equivalent, having a movement up and down, or lengthwise upon the shaft of the block, substantially as herein specified.

46,553.—Machine for Stretching Hat Bodies.—R. Eickemeyer, Yonkers, N. Y.:

First, I claim the employment, in the process of stretching hats, of a skeleton or ribbed and recessed former, substantially such as is herein described.

Second, The pressing ring, E, in combination with the skeleton or ribbed and recessed former, substantially as and for the purpose herein specified.

Third, The employment, substantially as herein described, in combination with the skeleton or ribbed and recessed former, of pressing rollers, K M, or other equivalent pressing devices, operating as herein set forth.

Fourth, The combination in a machine for stretching hats of a skeleton or ribbed and recessed former, a pressing ring, and a system of rollers or other equivalent pressing devices, the whole combined and operating substantially as and for the purpose herein specified.

46,554.—Composition for Lining Barrels for Petroleum, Etc.—Lewis Francis, New York City.—Ante-dated Nov. 21, 1864 :

I claim combining glue and glycerine with or without sugar, to form a new and useful composition, for the purposes specified.

46,555.—Faucet for Oil or other Liquids.—James D. Frary, New Britain, Conn.:

I claim as a new and improved article of manufacture a faucet made of iron, having the working surfaces of the orifice and plug made of brass, or brass and iron, in combination with the crooked nozzle, c, screw or tinned shank, a, substantially as described.

46,556.—Water Cooler and Purifier.—Abram J. Gibson, Cincinnati, Ohio, and George Emerson, Newport, Ky.:

We claim a purifier, C, cooler pipes, D and E, and pipes, B and G, with faucets, F H and K, the arrangement and construction in combination as and for the purpose herein set forth.

46,557.—Animal Trap.—Willard S. Gitchell, Peru, Ind.:

I claim the combination of the two rotating radial platforms, b b, operated by means of the wires, i i, rock shafts, e e, and spring triggers, c c, and through the pulling of the bait from one hook, k.

46,558.—Flexible Tubing.—Elliott P. Gleason, New York City. Ante-dated Feb. 5, 1865.

First, I claim the spiral frame work of flat wire, substantially as described for the purpose specified.

Second, I claim a flexible tubing composed of a spiral frame work of flat wire or a flat metal strip and an impervious external covering, or both an internal and external covering, substantially as described.

Third, I claim the lubricating impervious covering of leather, substantially as described.

46,559.—Hot-blast Pipe.—Carlos Glidden, Milwaukee, Wis.:

I claim making hot-blast pipes substantially as herein set forth.

46,560.—Amalgamator.—Alexander W. Hall, New York City:

I claim an amalgamator consisting of a horizontal rotating cylinder with internal lifters, C C, a stationary perforated tube, or its equivalent, inserted through the hollow journals of the said cylinder for the introduction of the vapor of quicksilver thereinto, and a cock or valve, g, to regulate or control the pressure of the vapor within the said cylinder, the whole combined, arranged and operating substantially as herein specified.

46,561.—Machinery for Crushing Quartz.—Alexander W. Hall and Daniel Bentley, New York City:

First, We claim the taper vertical socket, c c, by which the axle or axles of the several rollers are attached to the central vertical shaft in such manner as to permit either roller to rise independently of the others, substantially as herein specified.

Second, Applying pressure to the several crushing rollers by means of a lever, c, and nut, d, or their equivalent, applied directly to the central shaft, and operating on all the rollers alike, substantially as herein specified.

Third, The spring, f, applied in combination with the collars, e g, washer, h, nut or bearing, d, and central shaft, A, substantially as and for the purpose herein specified.

46,562.—Revolving Fire-arm.—Patrick Haughian, New York City. Ante-dated Aug. 28, 1864 :

First, I claim the arrangement of the cylinder stop lever, C, to work in rear of the cylinder upon a fulcrum pin, c, situated behind the recoil shield and between it and the hammer, substantially as herein specified.

Second, The combination of the so arranged lever of the elbow form herein described and represented in figures 1 and 2, in combination with the within described arrangement of the spring, i, to operate upon a shoulder, k, above the fulcrum of the said lever, substantially as herein set forth.

Third, A spring-sided stop lever or catch arranged to work in rear of the cylinder and between the recoil shield and the hammer, in combination with a cam on the hammer, in the manner and under a mode of operation substantially as described.

46,563.—Skate Feet.—Albert H. Hook and John H. Darlington, New York City:

We claim a skate foot made of a block of elastic material so formed as to be attached to and detached from a skate runner in the manner and for the purposes herein set forth.

46,564.—Device for forming Molds for Casting.—W. T. Horrobin, Biddeford, Maine :

First, I claim the swiveled plate, I, employed substantially as herein described for presenting different patterns or parts of patterns to the flasks.

Second, I further claim the combination of the plate, J, rods, K, and sliding rod, G, for supporting the plate, I, in its operating position or elevating it to be reversed.

Third, In combination with the above, I further claim the retaining fork, L h, and groove, g, for preventing the disturbance of the plate, I, while in use.

46,565.—Rake for Harvester.—Moses A. Keller, ———, Pa.:

First, I claim the self-adjusting universal jointed shaft, with its jointed links, r m n and q o p, sliding disks, K K, constructed, applied and operating as and for the purpose set forth.

I also claim the arrangement, in combination with the stationary case, B, with its tripper flange, S, and guide slides, R T, of the cap and its flanges, I J, chambered bottom for covering the ratchet wheel, E, and containing the click spring connecting it to the gearing, all surrounding a central fixed shaft, F, arising from the bottom of the case, B, and operated by the beveled pinion, M, in the manner and for the purpose specified.

46,566.—Mowing Machine.—John Jann, New Windsor, Md.:

First, I claim the close vertical casing constituting the main frame to which the tongue, C, and bearings, b b, of the axle, B', are attached, constructed in sections, A A', inclosing the gearing, substantially as set forth.

Second, In combination with the above, I claim the gearing, F G I J, crank shaft, K, and pitman, N, the whole being arranged to operate in the manner and for the object set forth.

46,567.—Paper Shirt Bosom.—Wm. E. Lockwood, Philadelphia, Pa.:

I claim as a new article of manufacture a shirt bosom made of one or more pieces of paper, or paper and cloth, when made convex in front and concave at the back, for the purpose specified.

46,568.—Fabric for Hats, Bonnets, etc.—Henry Lowenberg, New York City:

I claim the use of canton flannel or other textile material treated with the composition of liquid silex or size mixed with coloring matter for the purpose of dyeing and stiffening the cloth at the same time and subjecting to the action of a die or dies, substantially as herein described, for the purpose of producing hats, bonnets, etc., with any desired surface which may be glazed with a varnish either before or after pressure, as set forth.

46,569.—Invalid Bed.—Rodney H. Mathews, Painesville, Ohio :

I claim, first, The sleeved apron, J, of water-proof fabric, constructed and used as described.

Second, The frame, A, jointed as described, and consisting of four sections or parts, a b c and d, the said sections being rigid transversely, but yielding at the joints longitudinally, as and for the purpose set forth.

Third, The foot blocks, H H', and shoulder blocks, I I', constructed as described, or any equivalent construction, in combination with the slotted plates, e e', and f f', or their equivalents, for adjusting and securing them therein, as and for the purpose set forth.

Fourth, The use and employment of the triangular handles, D and D', as herein explained, and for the purpose specified.

Fifth, I claim as a new and improved article of manufacture the described portable sick bed and accouching frame, constructed and arranged as stated, and for the purposes set forth.

46,570.—Method of Curing Burns and Scalds.—Leonard Maxwell, Mitchel, Ind.:

I claim the process of curing burns and scalds by the application of a coating of copal varnish to the burned or scalded parts of the body, substantially as and to the effect described.

46,571.—Stop Valve.—John McClelland, Washington, D. C.:

I claim, first, The hollow sliding stop valve, open at the bottom, the same being constructed and operating in the manner described for the purposes herein set forth.

Second, In combination therewith, the rings, a, constructed substantially as described.

Third, In combination with the invention claimed in the first clause, the rings, a, applied substantially as described.

46,572.—Street Washer.—John McClelland, Washington, D. C.:

I claim, first, Making the lower end of street washer cases pointed or cone shaped, in the manner herein described, for the purposes set forth.

Second, I claim the three-way cock, K, pipe, C, and key, D, arranged substantially as described.

Third, I claim the small channel, i, in the plug, k, connecting with the orifice, n, and the outlet, o, to discharge waste water, as herein set forth.

Fourth, I claim the lugs, p p and q q, and the projections, h h, on the cock, K, in combination with the nibs, r r, and the case, A, for holding the cock firmly in place.

Fifth, I claim embracing the cap, F, and the rod, D, of a street washer by a single attachment, substantially as described.

46,573.—Spring Mattress.—G. W. Mitchell, Saint Louis, Mo.:

I claim, first, The guide cones, d, in combination with the springs, A, caps, C, and flexible connections, c, applied substantially as and for the purpose described.

Second, The flexible connecting pieces, E, in connection with the caps, C, of the springs, applied and operating substantially as and for the purpose specified.

Third, The steady pins, b, and locking bars, D, in combination with the preceding.

Fourth, Stuffing the mattress on the sides as well as on the top, substantially as and in combination with the preceding.

46,574.—Carpenter's Hammer.—John O. Montignani, Albany, N. Y.:

I claim the method of constructing a hammer by finishing what is ordinarily a claw end with a steel cutting edge, like that of an adze or chisel, as described in the above specification.

I claim also the construction of the cleft for drawing nails, as shown at E, in combination with the above adze or chisel edge.

46,575.—Interlined Under-garment for Ladies.—C. L. Morehouse, Cleveland, Ohio :

I claim the garment, when provided with a detachable interlining of soft leather, as herein set forth, the same being a new article of manufacture.

46,576.—Escapement for Timepiece.—Don J. Mozart, New York City:

I claim, first, The hooked detent, h, applied to the scape wheel, A, for arresting the same, in conjunction with a tripping tooth, e, and pallet, e, arranged and operating substantially as described.

Second, The detent rest, i, when applied to a detent which is constructed and operated substantially as described.

Third, Forming the detent spring, s', and the tripping spring, s, in one piece, and applying the same to the detent staff, j, substantially as described.

46,577.—Calendar Clock.—Don. J. Mozart, New York City:

I claim, first, Causing the wheel, B, to release the mouth disk, C, once in every revolution of said wheel, by means of a pin, k', acting upon the escapement, E, of said disk substantially as described.

Second, The pivoted, cresent shaped escapement, E, in combination with the pins, p, on a notched disk, C, when these parts are arranged and operated substantially as described.

Third, The pinion, b, cam, b, and spring slide, s, in combination with the notched disk, C, and pall, H, substantially as described.

Fourth, The notched disk, C, constructed as set forth, in combination with levers, b b', having teeth, a a' a'', and lugs, c c', formed on them, and which are acted upon by a spring, b2, substantially as described.

Fifth, operating the day hand, D, by means of the tripping arm, h3, pawl, l, and notched wheel, j, when said arm is attached to and actuates the escapement of the wheel, B, substantially as described.

46,578.—Powder for facing Molds.—James Nichols and Wm. Batty, Cincinnati, Ohio :

We claim the molders' "facing" powder composed and prepared in the manner described.

46,579.—Bird Cage.—Charles L. Osborn, Brooklyn, N. Y.:

I claim, first, The combination of curved rest, B, rim, D, lip, E and hook, F, or their equivalents, operating together to secure a cage to its base.

Second, The arrangement described by which the feed cups are inserted and secured without danger of the escape of the bird when removed.

46,580.—Hoisting Apparatus.—Charles R. Otis, Yonkers, N. Y.:

First, I claim the combination of a governor and brake with each other and with the drum of a hoisting machine to operate substantially as herein specified under the circumstances herein set forth.

Second, Combining the governor with the loaded lever of the brake by means of a lever, r, or its equivalent deriving motion from the governor and acting as a support under a portion of the said loaded lever while the rotation of the governor does not exceed a certain velocity but escaping from under the said loaded lever when such velocity is exceeded, substantially as and for the purpose herein described.

Third, Applying a safety device at or near the highest point of a hoisting apparatus to operate substantially as and for the purpose set forth herein.

46,581.—Soda Water Cooler and draught Pedestal.—George W. Palmer, Brooklyn, N. Y. Antedated Feb. 20, 1865 :

I claim, first, The opening and door on the side of the refrigerator draught pedestal.

Second, The cooler made substantially as set forth and for the purpose described.

Third, The coating or lining of soda water coolers as herein described.

46,582.—Steam Engine.—Daniel H. Paullins, Londonville, Ohio :

I claim the movable cylinder, E, provided with apertures, e e', to permit the steam to enter and escape from said cylinder alternately at the respective ends thereof when the said cylinder is moved by the action of its own piston head substantially as and for the purpose explained.

Second, In combination with the above I claim the arrangement of the chest, G, inlet pipes, G' G'', and grooved valve seats, F F', when employed in connection with the movable cylinder, E.

Third, In combination with the cylinder, E, actuated by its own cylinder head as specified I further claim the stationary external cylinder, H, and escape pipe, H', employed in combination with the movable cylinder, E, for the purpose of receiving and carrying off the steam after acting upon the piston as stated.

46,583.—Horse Rake.—John Pennypacker, Charlestown, Penn.:

I claim, first, The cams, h, constructed and arranged in respect to the levers, G, and ratchets, I, substantially as and for the purpose specified.

Second, The notched plate lever, Q, and plate, s, in combination with the levers, G, substantially as and for the purpose set forth.

46,584.—Bee-hives.—Hiram Pensyer, Centralia, Ill.:

I claim, first, the dark chambers, m m, above the side entrances, e e, to the litter box below in combination with said litter box, A, constructed with a sliding bottom, f, all constructed and arranged as and for the purposes described.

Second, The main hive, B, with its entrance, q, and dark chamber, r, in connection with the litter box, A, provided with entrances, e e, on each side of entrance, q, and sliding bottom, f, when constructed and arranged as and for the purposes described.

46,585.—Manufacture of Glucose.—George R. Percy, New York City :

I claim the obtaining of glucose or grape sugar from the whey of milk or from milk sugar.

46,586.—Tip for Oil Cup.—Frank P. Pfleghar and Wm. Shollhorn, New Haven, Conn.:

We claim a new article of manufacture the herein described cast metal tip for oil cups.

46,587.—Bag Mouth Fastener.—Timothy K. Reed, North Bridgewater, Mass.:

I claim a fastening device for bags having a construction substantially as specified.

46,588.—Spinning Machine.—John Rich, Conway, Mass.:

I claim, first, The combination in a tool spinning frame or machine of the twisting spindle, B, ring and traveler, E, and a draw twisting whirl, F, with its holding fingers, c d, substantially as and for the purposes herein described.

Second, The combination with the draw twisting whirl and its holding fingers, c d, of the holding clamp, T, and feed roll, Q, substantially as and for the purposes described.

Third, The combination with the feed roll of the feed pulley, R, and spring feed arm, Z, substantially as and for the purposes described.

Fourth, The combination of the dogs, y, and z, with the incline on the long upright piece, Y, and sliding pin, H, for the purpose of operating the feed arm, Z, substantially in the manner herein described.

Fifth, The use and employment in wool spinning machines of a friction pad acting intermittently on the pulley of the feed roller, for delivering the roving, as and for the purposes set forth.

Sixth, The combination with the clamp, T, of the mechanism described for operating it at the proper time substantially as set forth.

Seventh, The hinged dog, x, in combination with the incline on the short upright piece, N, as and for the purpose set forth.

Eighth, The adjustable face, 7, in combination with the upright piece, v, and hinged dog, x, or the equivalent thereof for the purpose stated.

Ninth, The draw twisting whirl, F, in combination with the holding or retaining fingers, c d, constructed and operating as and for the purposes herein described.

Tenth, The combination of mechanism constructed and arranged substantially as above described for drawing and twisting woolen threads simultaneously as herein set forth.

46,589.—Row Lock.—Wm. Sage, Berlin, Conn.:

I claim the plate, C, having a hub, D, twined up either with or without a screw, or corrugated surface formed thereon in combination with the chamber in the base of a row lock substantially as described.

Second, I claim the employment of the twin bolt, E', or its equivalent in combination with the row lock plate, C, substantially as described.

46,590.—Trace Lock.—J. B. Shaw, New Haven, Conn.:

I claim the herein described trace lock constructed substantially as specified.

46,591.—Wood Bending Machine.—Fridolin Smith and Peter Swope, Tiffin, Ohio:

First, I claim securing the patterns, F, in position to receive the strips, g, of wood as they are bent by means of expansible blocks, G G, substantially as described.

Second, applying the pattern holders, G G, to the frame of the machine that they can be elevated or depressed and held down firmly in place to receive the strip of wood as it is bent substantially as described.

Third, the bending heads, c c, in combination with the strip, d, and detachable strip, d', when used in conjunction with a pattern, F, and expansible holders, F G, substantially as described.

Fourth, The arrangement of the hooks, c c, strip, d', and adjustable clamp, f f', in combination with the bending devices described and the removable pattern, substantially in the manner and for the purpose described.

46,592.—Spring Balances.—Wm. B. Snyder, Lakeville, Conn.:

I claim the arrangement of the two sliding indices to weighing balances in the manner and for the purpose substantially as herein set forth and described.

46,593.—Cooling and Ventilating Ships and other Vessels.—Daniel E. Somes, Washington, D. C.:

First, I claim cooling and ventilating vessels in the manner herein described.

Second, I claim cooling air for the purpose of cooling and ventilating vessels by forcing the air through submerged pipes or their equivalents substantially as set forth and described.

Third, I claim the forcing of air into ships and other vessels by the motion of such vessel in the water or by the action of the waves against or around the vessel.

Fourth, I claim affixing to the side of the ship or vessel a device or devices substantially as described so that the motion of the vessel in the water or of the water against the vessel shall produce a blast of air as described.

Fifth, I claim the devices herein described or their equivalents for airing, cooling and ventilating vessels for carrying grain or other perishable freight.

Sixth, I claim constructing the interior of a vessel for carrying grain or other perishable freight substantially as described so that air may be conveyed through said vessel by means of perforated walls or tubes as set forth, and this whether the air has been previously cooled or not.

46,594.—Cooling and Condensing Apparatus used in Brewing and Distilling.—Daniel E. Somes, Washington, D. C.:—

First, I claim the manufacture and use of coolers and condensers for use in brewing and distilling constructed and operating substantially as herein set forth and described.

Second, A cooling apparatus for cooling worts beer and other similar liquids composed of one or more subterranean tanks, reservoir pipes or their equivalents for cooling water in combination with suitable apparatus for using the water thus cooled for the purpose of cooling worts, beer or similar liquids.

Third, The combination of a subterranean cooling apparatus for cooling water with suitable apparatus for condensing and cooling distillates substantially as set forth and described.

Fourth, The combination of the subterranean cooling vessels the apparatus for cooling and condensing liquids or distillates with a pump propeller screw or other suitable means for causing a circulation of the water in apparatus constructed according to the principle of Fig. 2, as herein set forth and explained.

46,595.—Cooling Preserving Houses, Packing Houses, Refrigerators and other similar Structures.—Daniel E. Somes, Washington, D. C,:

I claim the process herein described for the purpose of cooling preserving houses, packing houses, refrigerators, store rooms, and similar structures, said processes consisting in using the low temperature of the earth at certain depths below its surface for the purpose of cooling either water or air or both by means of a combination of devices and apparatus substantially such as herein described or their equivalents.

Second, I claim the process herein described or any equivalent means for cooling water in combination with the process for cooling air by first compressing it in contact with a cold surface and then permitting it to expand when used for the purpose of cooling and preserving as herein set forth and described.

Third, I claim cooling refrigerators and salting tanks in packing houses and other similar structures by means a current of cold water or cold brine as set forth and described.

46,596.—Mode of Cooling and Ventilating Dwellings, Churches, Hospitals, Theaters and other Buildings.—Daniel E. Somes, Washington, D. C.:

I claim, first, Cooling and ventilating dwellings, churches, hospitals, theaters and other buildings substantially as herein set forth and described.

Second, The combination of a system of subterranean pipes, tanks or reservoirs, with a corresponding system of pipes, channels, reservoirs or their equivalents, in or near the building to be cooled, so as to cool and ventilate substantially as described.

Third, Cooling air by conducing it through or around water pipes, or compressing it in pipes, tanks or reservoirs, in contact with any cooling medium, and then permitting it to expand so as to cool and ventiliate buildings substantially as described.

Fourth, Cooling and equalizing the temperature of buildings by means of refrigerating chamber or chambers, with water pipes or their equivalents for conveying a current of water, in combination with suitable devices and apparatus for cooling the water, all substantially as set forth.

Fifth, Cooling buildings by means of pipes or other channels for water placed in the wall, between the two walls, or in the buildings to be cooled, and connected with a subterranean refrigerating apparatus as set forth and described.

Sixth, Combining with the devices herein described for equalizing the temperature of the earth below its surface, devices for heating or warming such water, so as in cold weather to warm buildings constructed substantially as herein set forth and described.

Seventh, The construction of iron buildings with tubes, channels or spaces in the walls, in combination with cooling and warming apparatus constructed substantially as herein set forth and described.

46,597.—Percussion Grinder.—Ansom P. Stevens, Brooklyn, N. Y.:

I claim the combination of the two grinders one of which turns upon the other and is raised and permitted to fall at intervals so as to pound and grind the material alternately, substantially as set forth.

I also claim the combination of the said two grinders with aperatures in the lower grinder for the escape of fine material, substantially as set forth.

46,598.—Smoking Pipe.—John D. Stewart, Baltimore, Md.:

I claim giving such a shape to the stem, B, of a tobacco-pipe as to orm a trap, d, in the smoke passage thereof for the purpose herein described.

I also claim the openings to the aforesaid trap, d, in connection with the removable devices for closing the same substantially as described and for the purpose herein set forth.

46,599.—Lifting Jack.—Wm. M. K. Thornton, Clinton Junction, Wis.:

I claim the combination of the friction wheels, a a, with the jack staff, B, which is operated by means of a rack and segment substantially as described.

Second, The application of friction wheels to the back edge of a jack staff which has a rack formed on its opposite edge adapted to receive the toothed segment formed on the end of the removable lever, C, substantially as described.

Third, The relative arrangement of the bearings, f f, and friction wheels, a a, on the standards of the jack staff which is operated substantially as described.

46,600.—Lamp Shade.—M. J. Wellman and J. J. Greenough, New York City:

I claim the shade holder constructed in the manner and for the purpose herein set forth.

46,601.—Heating Furnace.—George W. Wilson, Chelsea, Mass.:

I claim the combination and arrangement of the fire-place, B, ash chamber, C, radiator, E, descending pipes, i i, horizontal flues, h h, ascending pipes, g g, damper, f, and escape flue, e', the whole being arranged with respect to the air heating chamber, A, substantially as set forth.

I also claim the combination of the air receiving chamber, I, and ts vibratory valves, l l, with the air treating chamber, A, and the fire place provided with flues substantially as described for the escape of the volatile products of combustion.

I also claim the arrangement of the air ducts, G H H, with the air receiving chamber, I, the air heating chamber, A, the fire place, B, and ash chamber thereof.

46,602.—Plugging Instrument for the Teeth.—Barnabas Wood, Albany, N. Y.:

I claim the herein-described instrument, consisting of a metallic head, as described, affixed to a tubular shaft, whether of metal or other material, for an instrument for filling teeth, with the herein-mentioned fusible metal filling or other similar material.

I claim, first, The construction of the head, A, with a bulb, plate and neck, as represented.

Second, The formation of the bulb, b, between the blade, a, and the neck, c.

Third, The combination of the head, A, and tubular shaft, B or E.

Fourth, Also the application of the insulating tubular casing, D, to the tubular shaft, B.

46,603.—Pipe Coupling.—Warren N: Abbott (assignor to himself and Dwight B. Rich), Boston, Mass.:

I claim the within-described detachable coupling, in which the end of the pipe is confined between the two portions, B and C, in the manner substantially as described.

46,604.—Machine for Cutting Pasteboard for Boxes.—Elizur E. Clarke (assignor to Franklin N. Clarke), New Haven, Conn.:

I claim, first, The zig-zag cutter, constructed and arranged in relation to the cutter holder, cutter stock, cutter bar and main cylinder, so as to operate in the manner and for the purpose described, and whether the same is used in connection with scoring or ordinary cutters, substantially as set forth.

Second, The combination and arrangement for the adjustment and suspension of the upper feed roll, B, substantially as set forth and described, and for the purpose specified.

46,605.—Gas-burning Stoves.—Henry Howson (assignor to Stuart & Peterson), Philadelphia, Pa.:

I claim, first, An annular-perforated plate, E, arranged on or forming a part of a round or cylinder stove, at or near the upper end of the fireplace, in combination with an annular-perforated plate or register, F, when the latter, as well as the register, are so formed and adapted to each other that any difference in the expansion or contraction of the register and plate cannot impair the former or disturb its tendency to fit by its own weight on the plate, E.

Second, An inclined plate, E, formed by the annular indentation of the stove immediately above the fireplace, in combination with the annular-perforated plate or register, as seen in Figs. 4 and 6.

Third, Two circular and indented or beveled surfaces, formed by contracting the body of the stove, in combination with two annular-perforated plates, the one above and the other below the point contracted as seen in Fig. 3.

Fourth, In combination with the ash-box, I claim the beveled damper, I, with its perforations or notches, when the said damper is adapted to the beveled opening of the ash-pit, and its notches or perforations, substantially as set forth, for the purpose specified.

46,606.—Horse Collar and Hames.—Martin Killacky (assignor to himself and J. G. Rouse), Philadelphia, Pa.:

I claim the hames, A A', combined with and forming part of the collar, B B', when the said hames are hinged together at the top and connected together at the bottom, by the device herein described, or the equivalent to the same, for the purpose specified.

46,607.—Mode of Making Wick.—Antonio Meucci, Richmond, N. Y., assignor to Wm. E. Ridder, New York City:

I claim the new manufacture of wick and wicking of decomposed vegetable fiber, substantially as herein set forth.

46,608.—Proportion of India-rubber for the Manufacture of Hose, Belting, Packing, Etc.—Edwin L. Simpson, Bridgeport, Conn., assignor to Simon Stevens, New York City:

I claim preparing india-rubber for mechanical purposes in the manner substantially as herein set forth.

46,609.—Manufacture of Hard Rubber.—Edwin L. Simpson, Bridgeport, Conn., assignor to Simon Stevens, New York City:

I claim the compound produced by combining the within-described vulcanizing compound with india-rubber, and the said compound cured in the manner and for the purpose herein set forth.

46,610.—Process of Manufacturing India-rubber, Gutta-percha, Etc.—Edwin Simpson, Bridgeport, Conn., assignor to Simon Stevens, New York City:

I claim, first, The within-described compound of vegetable oil and sulphur, prepared substantially as and for the purposes specified.

Second, The manufacture or preparation produced by combining the within-described compound with india-rubber, gutta-percha, or other similar gum or gums, substantially as and for the purposes specified.

46,611.—Water-proof Fabric.—Edwin L. Simpson, Bridgeport, Conn., assignor to Simon Stevens, New York City:

I claim as a new article of manufacture, coating water-proof fabrics with flocks, when the fabric is first prepared in the manner herein set forth.

46,612.—Revolving Fire-arm.—Charles Edward Sneider assignor to himself and Thomas Poultney), Baltimore, Md.:

I claim, first, The pins, D, passing through the rear part of the cylinder, and provided at their forward ends with heads, d', adapted to act as gas checks, in the event of gas escaping from the rear of the cartridge.

Second, In combination with the aforesaid pins, D, I claim the described construction and relative arrangement of the rear end of the cylinder and the hammer, whereby the pins, D, after having been employed for the explosion of the cartridges, are made capable of an additional forward movement, to effect the ejection of the exploded shells, as explained.

46,613.—Telegraph Cable.—Daniel H. Southworth, New York City, assignor to himself, Blase Lorillard and Chas. Ferris, White Plains, N. Y.:

I claim inclosing and separately insulating several telegraph wires or conductors in a cable, by means of an insulating piece, having pins or flanges, and otherwise constructed substantially as herein specified.

46,614.—Bench Plane.—Wing H. Taber (assignor to himself and Thos. H. Abbott), Lowell, Mass.:

I claim the combination of the adjustable bed or bearing, G, the screws, F and D, and the lever, E, the whole being arranged with respect to the plane iron, and the stock, substantially as specified.

I also claim the arrangement of the adjustable bed, G, with the fulcrum screw, D, the lever, E, the screw, F, the plane iron, B, and its bearing, b, arranged at the lower part of the throat, a, as described.

46,615.—Seed Planter.—George W. Brown, Galesburg, Ill.:

First, I claim, in combination with a seed-planting machine, having its seeding devices forward of the center of the wheels, a movable seat, F, with wheels, f and f2, and guides, a and a', for the purpose described.

Second, I claim, in combination with the operative parts of a seed-planting machine the metal sockets, A, constructed as shown, and arranged for use in combination with the side frames, A' A2, for the purpose of widening and narrowing the machine, in the manner and for the purpose specified herein.

Third, I claim the employment of a corresponding metal socket, H, and adjustable side parts, H' H2, in combination with the frame, A A' A2, or its equivalent, so that the seed bar shall be shortened and lengthened to correspond with the changes in width of the frame, substantially as herein specified.

Fourth, I claim, in a continuously-progressing seed-planting machine, wherein the seed-dropping mechanism is operated by an attendant, in contradistinction to automatic dropping, the operating of horizontal seed wheels by hand, so as to make complete revolutions by increments, substantially in the manner and for the purposes herein set forth.

Fifth, I claim in a seed-planting machine, the employment of seed-dropping wheel and operating fork, combined and arranged as herein represented and described, so that the movement of the fork in one direction will act on the wheel to turn it to a certain extent in a certain direction, and the movement of the fork in the opposite direction will act on the wheel to turn it to a certain extent in the same direction as before, thus turning the wheel by increments around in one uniform direction, by reciprocating movements of the fork, as herein set forth.

Sixth, I claim in such machine holding the drill mechanism at rest, by carrying the inclines, u, beyond the range of the pins, T, substantially in the manner and for the purpose herein set forth.

Seventh, I claim, in combination with a seed planting machine, carried on wheels, the employment of two independently-operated scrapers, X X2, which are severally forced against and released from the supporting wheels, at the will of the operator, by means of treadles, Y' Y2, connected and arranged to operate substantially as and for the purpose herein set forth.

RE-ISSUES.

1,882.—Manufacture of Wrought Cannon.—Horatio Ames, Falls Village, Conn. Patented Aug. 16, 1864:

I claim in a wrought-iron gun composed of a series of concentric rings welded together, and to the plates forming the breech of the gun, the turning or planing of the contact surfaces thereof before welding, so as to have them sealed and clean, to insure perfect welding, substantially as described.

I also claim in a wrought iron gun composed of a series of concentric rings welded together, the so shaping of one of the end surfaces that is to be welded to the next adjacent end surface as that they shall first unite at or near the base, and thence be welded toward the primeter, substantially as and for the purpose described.

I also claim as an auxiliary in the making of a wrought-iron gun composed of a series of concentric rings welded together, a portable and removable centering pin, for the purpose of matching the sections as they are put together, and for keeping the bore of the gun as nearly central and straight as possible, substantially as described

I also claim a wrought-iron gun composed mainly of a series of concentric rings that are fitted, and lap and butt, welded together, substantially as described.

1,883.—Method of making Mirrors or Looking Glasses. Louis Paul Angenard, New York City. Patented Jan. 31, 1865:

I claim the use and application of a solution of platina as a substitute for quicksilver for coating the surface of glass for making mirrors and looking glasses, substantially as hereinafter described.

1,884.—Truss Bridge.—Reuben Comins, Troy, N. Y. Patented Feb. 10, 1857:

I claim the employment of a shoe for bridges and truss frames, which is of the inverted, I, angular or curved shape where the ends of the diagonal braces rest, in combination with the projections, plates, or spurs extending through the stringers to the washers and nuts upon the opposite side of such stringers, in the manner and for the purposes substantially as herein described and set forth.

1,885.—Composition of Matter.—Lewis Francis and Cyrus H. Loutrel (assignees of Lewis Francis), New York City. Patented March 8, 1864. Re-issued Sept. 27, 1864:

We claim combining an alkali or alkalies or alkaline earths, or any of their compounds, with glue or glycerine, to form a new and useful composition of matter for various purposes.

1,886.—Composition of Matter.—Lewis Francis and Cyrus H. Loutrel (assignees of Lewis Francis), New York City. Patented March 8, 1864. Re-issued Sept. 27, 1864:

We claim combining glue, glycerine, and sugar or any other saccharine matter, to form a new and useful composition of matter for various purposes.

1,887.—Composition of Matter.—Lewis Francis and Cyrus H. Loutrel (assignees of Lewis Francis), New York City. Patented May 6, 1862.

We claim combining glue, glycerine, and castor oil, or any of the fixed oils, to form a new and useful composition of matter for various purposes.

1,888.—Harvester.—Reuben Hoffheins, Dover, Pa. Patented Nov. 3, 1863:

I claim, first, The main frame and gear frame, A A, constructed substantially as represented in figure 4, and herein described.

Second, The main frame and gear frame, A A, constructed open at each end, in combination with shafts, gearing and double drive wheels, arranged and operating substantially as and for the purposes specified.

Third, The flange, a, cast or formed upon the gear frame for the combined purposes of strengthening the latter and protecting the crank shaft, E, substantially as described

Fourth, The movable tongue, K, adapted to be attached to the frame on either side of the wheel, B', and employed to support or raise the inner end of the cutting apparatus, substantially as described.

Fifth, Providing for the attachment of the tongue or draft pole of a harvesting machine upon a draft frame, on both the inner and outer side of the drive wheel, B', in combination with the provision made for changing the point of support of the cutting apparatus from the inner to the outer side of the drive wheel, B', and vice versa, substantially as and for the purpose set forth.

Sixth, Attaching the cutting apparatus by means of the compound swivel joint, substantially as described, to the drag bar, I, arranged as described for the purpose set forth.

Seventh, The combination of the transverse swivel joint and bracing guides, h', substantially as and for the purpose set forth.

Eighth, The inner shoe constructed with the rear extension, h4, forming a means of attachment between the cutting apparatus and the platform, and with a means of attachment between it and a pendulous drag bar, so as to form a joint connenction therewith, all substantially in the manner and for the purposes herein described.

Tenth, The rigid arm projecting inward from the finger beam to a position beyond the wheel, B', in combination with a suspending device and an extension of the tongue or draft pole, substantially as and for the purposes set forth.

1,889.—Steam-engine Governor.—Junius Judson, Rochester, N. Y. Patented March 4, 1851:

I claim communicating the action of a governor to its valve or valves, gate, or equivalent regulating device, in such a manner that when the speed of the engine or motor becomes low, either from increase of resistance to overcome, or from diminution of pressure of the motive power, the said valve or equivalent will be accelerated or caused to move through a comparatively large space, to uncover or cover a comparatively small area of valve opening, so as to add to or take from the engine or motor comparatively large amounts of power; and also when the speed becomes high, either from diminution of resistance to overcome or from increase of pressure of the motive power, the said valve or equivalent will be, by a like change of speed, retarded or caused to move through a comparatively small space, to uncover or cover a comparatively small area of valve opening, so as to add to or take from the engine or motor comparatively small amounts of power for the purpose of securing, as nearly as may be, uniform speed of the engine or motor under all variations of the power or resistance, substantially as herein set forth.

1,890.—Base-burning Stove.—Dennis G. Littlefield, Albany, N. Y. Patented Jan. 24, 1854. Re-issued Nov. 8, 1864:

I claim the combination of a reserve fuel supplying cylinder, a separate fire pot, a chamber to receive the products of combustion, and an exhausting exit flue, substantially as and for the purposes described.

1,891.—Railroad Rails.—Wm. D. O'Brien, Brooklyn, N. Y. Patented July 19, 1864:

I claim an iron bar formed thicker in the middle than at the sides or edges, and curved in substantially the form specified for the purposes set forth.

I also claim the joint plate, e, curved on its under side to set upon the sill and with its upper surface corresponding to the under side of the railroad bars, for the purposes and as specified.

1,892.—Straw Cutter.—D'Arcy Porter and K. Smith (assignees of D'Arcy Porter), Cleveland, Ohio. Patented July 5, 1864:

We claim, first, The spring, D E, or its equivalent, knife, F', and vibrating box or board, when arranged and operating substantially as and for the purpose set forth.

Second, We claim the gage plate, J, and box, B, in combination with the knife, F', and spring, D E, as and for the purpose herein before described.

1,893.—Horse Hay Rake.—Randal Pratt, Marple Township, Pa. Patented Jan. 8, 1856:

I claim, first, A wheeled rake, with a standboard or platform, C, two sets of treadle levers, two footboards and a lifting and a pressure bar, arranged and operating substantially in the manner and for the purpose described.

Second, A wheeled rake, with a hand rail, a standboard, treadle levers, footboards, and a lifting and a pressure bar, arranged and operating substantially in the manner and for the purpose described.

Third, The arrangement of the pressure bar, k, upon levers, k' k', which are independent in their rising movements of the treadle levers, k2 k2, but are dependent upon said levers or their equivalent in their depressing movement, substantially as and for the purposes herein set forth.

Fourth, The arrangement in a wheeled rake of independently articulating teeth, a lifting bar, a pressure bar and treadles, substantially in the manner and for the purposes herein described.

Fifth, The arrangement with rake teeth, which terminate on their axial rod as described, of a pressure bar and a lifting bar, such bars having separate movements imparted to them, and both acting on the teeth at points in rear of the axial bar, b, substantially as herein described.

Sixth, The concentric arrangement of the lifting and pressure bars, or either of them, in combination with the extending of the frames or levers of said bars in front of the axial bar, b, and with the arrangement of the bars, G and K, in rear of the axial bar, b, substantially in the manner and for the purpose described.

Seventh, A treadle frame with lifting bar, G, pivoted concentric with the axis of motion of the rake teeth, in the manner and for the purpose set forth.

1,894.—Horse Hay Rake.—Randal Pratt, Marple Township, Pa. Patented Jan. 8, 1856:

I claim, first, Constructing a wheeled horse rake with a vibrating clearer to its teeth, so that the attendant or driver while riding on the rake carriage can operate the clearer and the rake teeth, substantially in the manner and for the purpose described.

Second, The arrangement and connection of a vibrating clearer with a vibrating rake, so that converse vibrating movements can be imparted to the rake teeth and to the clearer, at the same time and by the one actuating contrivance, while the machine is in operation and the attendant, who vibrates the rake and clearer, is mounted upon the machine, substantially as herein described.

1,895.—Horse Hay Rake.—Randal Pratt, Marple Township, Pa, Patented Jan. 8, 1856:

I claim the staple guides, p, to rake teeth, substantially as and for the purposes set forth.

1,896.—Casting Bottoms on Sheet Metal Ware.—Leonard J. Worden, Utica, N. Y., assignor to himself and Hicks, Wolfe & Co., New York City. Patented June 2, 1863:

I claim the employment of cast-iron bottoms in the manufacture of teakettles, wash boilers, coal hods, pans and other articles for kitchen use, united to and combined with the cylinder or body thereof in the manner and by the means substantially as herein described and set forth.

1,897.—Machine for making Drain Pipe.—Bradford S. Pierce, New Bedford, Mass., and Mason R. Pierce, New York City. Patented April 19, 1859:

We claim, first, A mold consisting of a case capable of being properly secured around the material while the pipe is being molded and of being freed from the pipe when the molding is completed, in combination with a core, and also with a core socket having a provision for freeing the socket or pipe or both from the core, the whole operating substantially as set forth.

Second, The arrangement of the mixing apparatus and of the core-relieving devices above the platform which conveys the molds, in the manner and for the purpose substantially as specified.

Third, The combination of the core socket with the revolving disk which receives the core and the mold, when the disk contains a provision for enabling the socket or pipe or both to be freed from the core, substantially as described.

DESIGNS.

2,031.—Plates of a Cookstove.—Lewis Rathbone, Albany, N. Y.

2,035.—Plates of a Cookstove.—Lewis Rathbone, Albany, N. Y.

2,036.—Plates of a Cookstove.—Wm. W. Stevens (assignor to Nathaniel P. Richardson & Co.), Portland, Me.

EXTENSIONS.

Machines for Turning Irregular Form.—Philo S. Beers, Harnden, Conn.—Patented Feb. 18, 1851. Extended Feb. 11, 1865:

I claim, first, The three-cutter cylinders, A B C, with cutters arranged as within described, in combination with the sliding frame, compound cams and cam rails, constructed and arranged substantially in the manner and for the purpose herein described.

Second, I claim the combination of the compound cams and cam rails, with the sliding frame and devices, within described, for holding and revolving the timber material, whereby such vertical motion is produced in the latter, while being subjected to the action of revolving or vibrating cutters, as to reduce the timber to the required form.

Drawing Regulator for Spinning Machine.—Newell Wyllys, South Glastenbury, Conn. Patented Jan. 28, 1851. Re-issued July 12, 1864. Extended Jan. 20, 1865:

I claim the combination of the escapement mechanism, or its mechanical equivalent, with the trumpet, M, the counter weight, W, or its equivalent, and mechanism substantially as described, for revolving the screw, e, of the belt slipper, and of the mechanisms by which the sets of drawing rollers are revolved, the said escapement mechanism being connected with the trumpet and applied to the gear, s, and consisting of the disk, t, the pawls, a b, and the lever, y, and its operative mechanism, substantially as hereinbefore explained.

I claim, also, The arrangement of the trumpet arm, E, as herein described, in combination with the system of weighted levers, the escapement, the belt-shifting mechanism, the reversed cone pulleys and the mechanism operated by tnem, whereby the force required to move the trumpet is made to vary under different circumstances to a sufficient extent to prevent over sensitiveness in the mechanism, which changes the relative speed of the drawing rolls to inequalities in the slivers, while, at the same time, but little force is required to effect such changes, thus proportioning the draw more nearly than heretofore to the quantity of fiber in the sliver, and thereby rendering the latter of more uniform diameter and density.

Ventilating.—Henry Ruttan, Coburg, C. W. Patented Jan. 31, 1851. Extended Jan. 21, 1865:

I claim the arrangement and mode of operating the valves, A A, in reference to the air-heating space around the stove, by which the amount of air from within and without is graduated by a single movement.

I claim, also, The arrangement of the horizontal air-heating trunk, the vertical, D, leading thereto, and its valve, S, in combination with the air-heating space, G.

Sewing Machine.—W. O. Grover and Wm. E. Baker, Boston, Mass. Patented Feb. 11, 1851. Re-issued Dec. 3, 1861. Extended Feb. 10, 1865:

First, We claim in combination, first, an eye-pointed needle, which descends and carries its thread through the material supported on a table; second, a table which supports the material horizontally below the needle and above a thread carrier; third, a thread-carrier below the table, carrying a thread which is not passed through the material, operating together substantially as set forth.

Second, We claim in combination, first, a horizontal table or support; second, a feeding apparatus; third, a stitching apparatus; each having the distinguishing characteristics hereinbefore specified, and operating substantially as set forth, to make the double looped seam herein described.

Rotary Pump.—J. Stewart Gwynne, New York City. Patented Jan. 14, 1851. Extended Jan. 13, 1865:

I claim thus extending said pipe when the collar on the opposite side is made adjustable, and the parts so arranged that the joints of the piston case with said pipe and collar may be tightened as they wear by tightening the adjustable collar only as described. The piston and case and the suction pipe being constructed substantially as herein described.

TO OUR READERS.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and enclosing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1853, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

MODELS are required to accompany applications for Patents under the new law, the same as formerly, except on design patents, when two good drawings are all that are required to accompany the petition, specification and oath, except the Government fee.

RECEIPTS.—When money is paid at the office for subscriptions, a receipt for it will always be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona-fide* acknowledgement of our reception of their funds.

INVARIABLE RULE.—It is an established rule of this office to stop sending the paper when the time for which it was pre-paid has expired.

Back Numbers and Volumes of the "Scientific American."

VOLUME IV., AND VOLUME XI., (NEW SERIES) complete (bound) may be had at this office and from periodical dealers. Price, bound, $3 00 per volume, by mail, $3 75 which includes postage. Every mechanic, inventor or artisan in the United States should have a complete set of this publication for reference. Subscribers should not fail to preserve their numbers for binding. VOLS. I., II., III., V., VI., VII., VIII., IX. and X., are out of print and cannot be supplied.



PATENTS

GRANTED

FOR SEVENTEEN YEARS.

MUNN & COMPANY,

In connection with the publication of the SCIENTIFIC AMERICAN, have acted as Solicitors and Attorneys for procuring "Letters Patent" for *new inventions* in the United States and in all foreign countries during the past *seventeen years*. Statistics show that nearly ONE-THIRD of all the applications made for patents in the United States are solicited through this office; while nearly THREE-FOURTHS of all the patents taken in foreign countries are procured through the same source. It is almost needless to add that, after *seventeen years'* experience in preparing specifications and drawings for the United States Patent Office, the proprietors of the SCIENTIFIC AMERICAN are perfectly conversant with the preparation of applications in the best manner, and the transaction of all business before the Patent Office; but they take pleasure in presenting the annexed testimonials from the three last ex-Commissioners of Patents.

MESSRS. MUNN & CO.:—I take pleasure in stating that, while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE CAME THROUGH YOUR HANDS. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the office, a marked degree of promptness, skill, and fidelity to the interests of your employers. Yours very truly,

CHAS. MASON.

Judge Mason was succeeded by that eminent patriot and statesman, Hon. Joseph Holt, whose administration of the Patent Office was so distinguished that, upon the death of Gov. Brown, he was appointed to the office of Postmaster-General of the United States. Soon after entering upon his new duties, in March, 1859, he addressed to us the following very gratifying letter.

MESSRS. MUNN & CO.:—It affords me much pleasure to bear testimony to the able and efficient manner in which you discharged your duties as Solicitors of Patents, while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and I doubt not justly deserved) the reputation of energy, marked ability, and uncompromising fidelity in performing your professional engagements.

Very respectfully, your obedient servant,

J. HOLT.

Hon. Wm. D. Bishop, late Member of Congress from Connecticut, succeeded Mr. Holt as Commissioner of Patents. Upon resigning the office he wrote to us as follows:

MESSRS. MUNN & CO.:—It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your agency; and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully, your obedient servant,

WM. D BISHOP.

THE EXAMINATION OF INVENTIONS.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a written reply, corresponding with the facts, is promptly sent, free of charge. Address MUNN & CO., No. 37 Park Row, New York.

As an evidence of the confidence reposed in their Agency by inventors throughout the country, Messrs. MUNN & CO. would state that they have acted as agents for more than TWENTY THOUSAND inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of inventors and patentees, at home and abroad. Thousands o inventors for whom they have taken out patents have addressed to them most flattering testimonials for the services rendered them; and the wealth which has inured to the individuals whose patents were secured through this office, and afterwards illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! Messrs. MUNN & CO. would state that they never had a more efficient corps of Draughtsmen and Specification Writers than those employed at present in their extensive offices, and that they are prepared to attend to patent business of all kinds in the quickest time and on the most liberal terms.

PRELIMINARY EXAMINATIONS AT THE PATENT OFFICE.

The service which Messrs. MUNN & CO. render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there; but is an opinion based upon what knowledge they may acquire of a similar invention from the records in their Home Office. But for a fee of $5, accompanied with a model, or drawing and description, they have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a patent, &c., made up and mailed to the inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through the Branch Office of Messrs. MUNN & CO., corner of F and Seventh streets, Washington, by experienced and competent persons. Many thousands of such examinations have been made through this office, and it is a very wise course for every inventor to pursue. Address MUNN & CO., No 37 Park Row, New York.

THE VALIDITY OF PATENTS.

Persons who are about purchasing patent property, or patentees who are about erecting extensive works for manufacturing under their patents, should have their claims examined carefully by competent attorneys, to see if they are not likely to infringe some existing patent, before making large investments. Written opinions on the validity of patents, after careful examination into the facts, can be had for a reasonable remuneration. The price for such services is always settled upon in advance, after knowing the nature of the invention and being informed of the points on which an opinion is solicited. For further particulars address MUNN & CO., No. 37 Park Row, New York.

The Patent Laws, enacted by Congress on the 2d of March, 1861 are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The law abolishes discrimination in fees required of foreigners, excepting natives of such countries as discriminate against citizens of the United States—thus allowing Austrian, French, Belgian, English, Russian, Spanish and all other foreigners, except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms. Foreigners cannot secure their inventions by filing a caveat; to citizens only is this privilege accorded.

CAVEATS.

Persons desiring to file a caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. The Government fee for a caveat is $10. A pamphlet of advice regarding applications for patents and caveats is furnished gratis, on application by mail. Address MUNN & CO., No. 37 Park Row, New York.

REJECTED APPLICATIONS.

Messrs. MUNN & CO. are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of their Washington Agency to the Patent Office affords them rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Their success in the prosecution of rejected cases has been very great. The principal portion of their charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted, are invited to correspond with MUNN & CO., on the subject giving a brief history of the case, inclosing the official letters, &c.

FOREIGN PATTENS.

Messrs. MUNN & CO., are very extensively engaged in the preparation and securing of patents in the various European countries. For the transaction of this business they have offices at Nos. 66 Chancery lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. They thing they can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through their agency.

Inventors will do well to bear in mind that the English law does not limit the issue of patents to inventors. Any one can take out a patent there.

Circulars of information concerning the proper course to be pursued in obtaining patents in foreign countries through MUNN & CO'S Agency, the requirements of different Government Patent Offices, &c. may be had, gratis, upon application at the principal office, No. 37 Park Row, New York, or any of the branch offices.

HOW TO MAKE AN APPLICATION FOR A PATENT.

Every applicant for a patent must furnish a model of his invention if susceptible of one; or, if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them, and sent, with the Government fees, by express. The express charge should be pre-paid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by a draft on New York, payable to the order of Messrs. MUNN & CO. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park Row, New York.

Patents are now granted for SEVENTEEN years, and the Government fee required on filing an application for a patent is $15. Other changes in the fees are also made as follows:—

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

SEARCHES OF THE RECORDS.

Having access to all the official records at Washington, pertaining to the sale and transfer of patents, MESSRS. MUNN & CO., are at all times ready to make examinations as to titles, ownership, or assignments of patents. Fees moderate.

INVITATION TO INVENTORS.

Inventors who come to New York should not fail to pay a visit to the extensive offices of MUNN & CO. They will find a large collection of models (several hundred) of various inventions, which will afford them much interest. The whole establishment is one of great interest to inventors, and is undoubtedly the most spacious and best arranged in the world.

MUNN & CO. wish it to be distinctly understood that they do not speculate or traffic in patents, under any circumstances; but that they devote their whole time and energies to the interests of their clients.

COPIES OF PATENT CLAIMS.

MESSRS. MUNN & CO., having access to all the patents granted since the rebuilding of the Patent Office, after the fire of 1836, can furnish the claims of any patent granted since that date, for $1.

EXTENSION OF PATENTS.

Many valuable patents are annually expiring which might readily be extended, and if extended, might prove the source of wealth to their fortunate possessors. Messrs. MUNN & CO. are persuaded that very many patents are suffered to expire without any effort at extension, owing to want of proper information on the part of the patentees, their relatives or assigns, as to the law and the mode of procedure in order to obtain a renewed grant. Some of the most valuable grants now existing are *extended patents*. Patentees, or, if deceased, their heirs, may apply for the extension of patents, but should give ninety days' notice of their intention.

Patents may be extended and preliminary advice obtained, by consulting, or writing to, MUNN & CO., No. 37 Park Row, New York.

ASSIGNMENTS OF PATENTS.

The assignment of patents, and agreements between patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park Row, New York.

UNCLAIMED MODELS.

Parties sending models to this office on which they decide not to apply for Letters Patent and which they wish preserved, will please to order them returned as early as possible. We cannot engage to retain models more than one year after their receipt, owing to their vast accumulation, and our lack of storage room. Parties, therefore, who wish to preserve their models should order them returned within one year after sending them to us, to insure their obtaining them. In case an application has been made for a patent the model is in deposit at the Patent office, and cannot be withdrawn.

It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with patent property or inventions to call at our extensive offices, No. 37 Park Row, New York, where any questions regarding the rights of Patentees, will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid) should be addressed to MUNN & CO. No. 37 Park Row, New York.

Notes and Queries

A. T., of Ohio.—Miller's Chemical Physics, recently published by John Wiley, No. 535 Broadway, N. Y., contains the latest and best treatise on electricity and magnetism.

S. O. C., of N. Y.—Magnetic iron ore is one of the most valuable of all ores of iron. The value of any deposit of iron depends upon the facility of quarrying and getting to market.

J. E. D., of Conn.—Lifting pumps are generally used at the oil wells. The piston works in the main iron tube. The average depth of the wells is some 500 or 600 feet. Air of the ordinary density at the surface of the earth exerts a pressure of 15 pounds to the inch, and if it be compressed to half its volume the pressure will be doubled. It follows the same law for further compression—"half the volume double the pressure." This is the famous Mariotte law. The specific gravity of petroleum varies with different specimens, but the pressure of a column a foot in hight will be five or six ounces to the square inch.

A. C. J., N. Y.—The rules of the Navy Department require persons seeking positions as engineers to work in a marine engine shop for two years preceding such application, and to pass an examination before a board of engineers convened for that purpose. You will find it more difficult to get a place in a New York shop than in the navy.

D. McC., Pa.—D. K. Clark is the best authority on locomotives. Colburn's Work on Locomotives, now publishing by John Wiley, of this city, is a valuable treatise on the subject.

G. W. A.—Your device for turning the centers will not work. If the two rods are both connected to one cross-head, but to different cranks, the cranks must both be on the center at once, or else neither will go over. You have been misled by an inaccurate drawing.

D. E., of Kansas.—Double-acting windlasses such as you propose are very old.

J. H. T., of Kansas.—Write to the party about his drill. We have no further information.

E. A. McI., of D. C.—India-rubber articles may be repaired by means of an india-rubber cement, which is sold by dealers in the article. The cement is made by dissolving india-rubber in spirits of turpentine, or now perhaps in benzine.

F. F. C., of N. J.—The magnesium light is made by simply burning a wire of the metal.

A. B., of Pa.—The kink or spring is given to hair in mattresses by twisting it up into a rope.

T. H. K., of N. Y.—Make your bushes of copper, 24; tin, 24; antimony, 8. Add the latter last, before pouring off. Vols. VII. and VIII. cannot be had.

W. H. A., of Mo.—Dragon's blood (bought at druggists) dissolved in spirits of wine, will color ivory red. So also will Brazil wood in stale urine—pound of wood to a gallon of liquid; put on boiling hot and wash with alum water before it dries.

W. M., of N. Y.—You can purchase a steam calliope—or steam musician—of H. A. Denny, Worcester, Mass.

Zinc, of Mass.—Zinc ore, the carbonate, containing 40 per cent of metal, is worth at the works about $15 per tun, in gold, and that containing 70 per cent is worth about $40. The process of reduction cannot be described in this place. There can be little doubt that your ore is valuable.

J. M., of Ill.—A gallon contains 231 cubic inches. Therefore multiply together the length, depth and width of your tank in inches and divide by 231, and you have the gallons it will hold.

Money Received

At the Scientific American Office, on account of Patent Office business, from Wednesday, February 22, to Wednesday March 1, 1865:—

W. S. McN., of Conn., $25; F. G. H., of Mass., $25; W. L. F., of N Y., $25; J. W. D., of N. Y., $25; M. W., of N. Y., $25; M. B. D., of N. Y., $25; J. A. B., of N. Y., $25; S. F. S., of N. Y., $25; J. W. C., of N. Y., $25; J. N. B. B., of N. Y., $25; G. M., of N. Y., $25; S. H., of N. Y., $41; E. T., of Pa., $20; W. P. & H. A. A., of Conn., $30; J. C. C., of Neb. Ter., $20; B. C., of N. Y., $20; T. A. H., of Ill., $55; E. N. F., of N. Y., $20; P. H., of N. Y., $40; D. F. P., of N. Y., $20; T. B. T., of N. Y., $20; D. S., of W. I., $120; G. W., of N. Y., $40; J. C. & G. S., of Mass., $20; F. L. T., of Wis., $45; D. McC., of Ohio, $20; L. A., of Conn., $65; G. M., of N. Y., $40; J. N. B. B., of N. Y., $40; E. H., of Ind., $20; S. & G., of R. I., $20; W. J. H., of N. Y., $25; J. P. W., of N. Y., $15; T. S. & W., of N. Y., $40; J. J., of N. Y., $40; S. & B., of Wis., $20; S. F. S., of N. Y., $45; L. H., of N. Y., $40; T. J. L., of R. I., $41; E. L. K., of Mass., $15; L. D., of N. Y., $80; H. J., of N. Y., $40; J. T. W., of N. Y., $20; S. R., of Ind., $20; O. E., of N. Y., $40; S. W. H. W., of N. Y., $40; N. B. LeP., of Ohio, $20; W. L. F., of N. Y., $40; J. H. D., of N. Y., $20; C. De St. C., of Vt., $25; J. B. T., of Conn., $20; D. M., of N. Y., $15; G. P. C., of N. Y., $15; A. W., of Conn., $45; G. W. B., of N. Y., $15; J. H., of N. Y., $15; W. R. M., of Pa., $20; S. E. S., of N. Y., $15; T. Van W., of N. J., $20; J. G., of Mich., $20; L. D. W., of Ill., $40; J. D. B., of R. I., $15; P. L., of N. Y., $15; D. & C., of Mass., $40; C. A. H., of Pa., $45; W. M. S., of N. Y., $80; A. J. S., of N. Y., $15; J. W. K., of Mass., $15; E. H., of N. Y., $15; J. P. W., of Ill., $21; W. B., of N. Y., $20; H. T. C., of Maine, $16; T. B., of Ill., $30; J. W. F., of Pa., $15; W. G. W. J., of Md., $200; A. W. L., of Ohio, $20; W. B. W., of Mass., $25; W. G., of Mich., $25; J. S., of Ohio, $40; H. & F., of Pa., $25; G. M. F., of Cal., $30; C. W. T., of Ill., $10; C. J. B., of Mass., $16; S. M. R., of Ill., $30; G. H. M., of Conn., $15; H. & R., of Cal., $10; C. K., of Pa., $16; J. S., of La., $15; S. & P., of Mass., $25; C. E. H., of N. Y., $15; J. H. G., of Ohio, $29; J. H. C., of W. V., $41; J. A. H., of Col. Ter., $50; F. E. C., of Ohio, $20; H. O. C., of Eng., $30; J. S., of Ind., $20; C. W. H., of Mass., $100; J. H. G., of N. J., $250; A. M. D., of Ill., $25; H. E. S., of Wis., $25; J. P. G., of Mo., $25; J. H., of W. V., $30; L. M. G., of N. Y., $25; D. S. G., of Ill. $30; C. H. K., of U. S. N., $157; C. T. M., of R. I., $15; E. R., of Mich., $15; J. S. K., of Ohio, $16; B. & B., of Pa., $16; T. C. L., of Conn., $15; V. W. B., of Vt., $25; J. L. R., of Ohio, $25; W. E., of Ohio, $21; W. C. B., of Ill., $25; C. C. C., of Ill., $25; W. H. H., of N. Y., $15; J. W. P., of Conn., $15; H. W. H., of Conn., $15; T. & P., of Mass., $30; J. R. C., of N. Y., $25; A. B., of N. Y., $30; B. & McN., of Mich., $25; H. Van D., of N. Y., $32; C. F. H., of Pa., $25; T. L., of Pa., $16; L. & P., of N. J., $15; J. F. Y., of Wis., $16; J. E. Y., of Pa., $25; J. B., of Pa., $15; E. W. G., of Mass., $25; W. K., of Ill., $25; J. W., of Mass., $25.

Persons having remitted money to this office will please to examine the above list to see that their initials appear in it, and if they have not received an acknowledgment by mail, and their initials are not to be found in this list, they will please notify us immediately, stating the amount and how it was sent, whether by mail or express.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office, from Wednesday, Feb. 22, to Wednesday, March 1, 1865:—

J. F. B., of Conn.; W. S. Mc. N., of Conn.; F. G. H., of Mass.; W. L. F., of N. Y.; J. W. D., of N. Y.; M. W., of N. Y.; M. K., of N. J.; J. A. B., of N. Y.; M. B. D., of N. Y.; S. F. S., of N. Y.; B. & W., of Ind.; J. W. C., of N. Y.; J. N. B. B., of N. Y.; G. M., of N. Y.; C. & D., of Ill.; S. H., of N. Y.; P. H., of N. Y.; D. S., of W. I.; G. W., of N. Y.; J. N. B. B., of N. Y.; W. J. H., of N. Y.; T. S. & W., of N. Y.; J. J., of N. Y.; S. F. S., of N. Y.; L. D., of N. Y., 2 cases; H. J., of N. Y.; W. L. F., of N. Y.; W. M. S., of N. Y., 2 cases; W. B. W., of Mass.; H. & F., of Pa.; S. M. R., of Ill.; W. G., of Mich.; S. & P., of Mass.; J. L. S., of Ind.; H. O. C., of Me.; J. S., of Ohio; G. M. F., of Cal.; L. B. L., of Cal.; T. R., of Ill.; T. A. B., of Ill.; C. D., of Mass.; C. C. C., of Ill.; V. W. B., of Vt.; J. W. F., of Cal.; H. F. B., of Mo.; A. M. D., of Ill.; H. E. S., of Wis.; J. P. G., of Mo.; L. M. G., of N. Y.; J. H., of W. V.; D. S. G., of Ill.; S. & P., of Ill.; J. L. R., of Ohio; A. W. L., of Ohio; W. K., of Ill.; A. B., of N. Y.; C. F. H., of Pa.; B. McN., of Mich.; J. E. Y., of Pa.

RATES OF ADVERTISING.

TWENTY-FIVE CENTS per line for each and every insertion; payable in advance. To enable all to understand how to calculate the amount they must send when they wish advertisements published we will explain that eight words average one line. Engravings will not be admitted into our advertising columns, and, as heretofore, the publishers reserve to themselves the right to reject any advertisement they may deem objectionable.

PEARSON CROSBY'S PATENTS
FOR THE
MANUFACTURE OF LUMBER OF ALL KINDS.

By means of these improvements lumber can be manufactured better, cheaper, and a great saving in material, as set forth in the following certificates.

The subscriber has been engaged in the manufacturing of lumber for the past twenty years. For the last ten years he has manufactured ten million feet annually.

"In the winter of 1863 and 1864, Mr. P. Crosby, of New York, applied to us to have us test his improved method of dressing and stretching saws, alleging that he could manufacture lumber in a superior manner, at a less expense, and a saving of 8 per cent. We expressed much doubt, as we thought we were manufacturing our lumber as well and as economically as it could be done. But finally consented to try the experiment.

"Mr. Crosby, in the spring of 1864, came to our mills, and put one gate in operation. We were so much pleased with it that we put three more gates in operation, at Phelp's Mills, and ordered the saws for five gates at the Dodge Mills. After eight months trial of the saws at Phelp's Mills, I can only say that we are, in the same number of hours, manufacturing ten per cent more lumber, doing it in a superior manner, and at less cost per 1,000 feet, with a saving of 6 per cent in lumber, than we did previous to adopting Mr. Crosby's Patent Stretchers and method of dressing saws.

"Signed, E. B. CAMPBELL.

"Phelp's Mills, Lycoming Co., Pa., Jan. 10, 1865."

"NEW YORK, January 20, 1865.

"We fully confirm the opinion of our Agent, Mr. E. B. Campbell, having every confidence in his judgment in everything connected with the manufacturing of lumber. He has been very careful in not over-estimating the advantages of Mr. Crosby's plan of thin saws. Our impression is, that in sawing inch boards, our usual saving is about equal to one board in eleven, or, rather, that the eleventh board is clear gain. The single or span saws are also calculated to make an equal saving.

"Signed, WM. E. DODGE, for self and partners."

Proprietors of Mills, who wish to consult or order these improvements, will address the subscriber, PEARSON CROSBY,
11 3 77 Johnson street, Brooklyn, L. I., N. Y., or Box 162 P. O.

LUNKENHEIMER'S IMPROVED GLOBE VALVE; A complete assortment of Brass Work for Locomotives, Portable and Stationary Engines. For samples and catalogue address CINCINNATI BRASS WORKS,
11 XII 26* No. 13 East Seventh street, Cincinnati.

BLACKING BOXES AND PACKING CASES.—WE are manufacturing and will make to order our Patent Asphaltic Board Boxes and Packing Cases, of any required size, for blacking, axle grease, tobacco, dry paints and other substances. The material we use is impervious to oils, alkalis and moisture, and is strong and durable, being quite equal to tin for many purposes, and can be furnished at less than half the cost. For our blacking boxes particularly we claim that for cheapness, strength, workmanship and general appearance they are superior to any in the market. Samples sent when requested. W. PAINTER & CO., No. 45 Holliday street, Baltimore. 11 2*

WANTED—A SITUATION AS MACHINE-SHOP Foreman. Have had 15 years experience in that capacity, building portable and stationary engines, mill work, etc. None need apply who have not a thorough go-ahead establishment, in a healthy locality. Address FOREMAN,
1* Box 402 Syracuse, N. Y.

MACHINERY, PORTABLE ENGINES, LATHES, Planers, Drills, Chucks and Machinists' Supplies, Cotton Gins, Portable Flour and Saw mills, Steam Pumps, Rotary Pumps, Force and Lifting Pumps of all kinds. Also all kinds of Oil-well Machinery, for sale by FAIRMAN & WILLARD,
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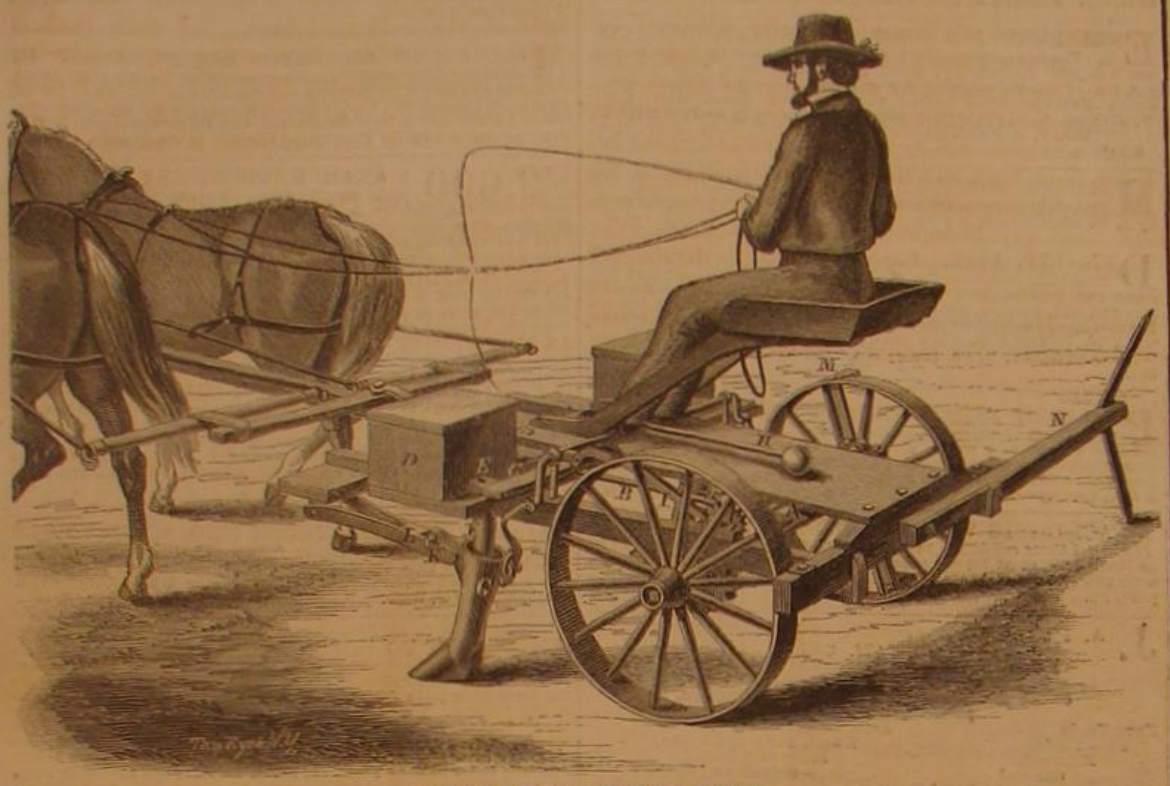
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spread wide apart in others. This is also advantageous where horse cultivators are used, for where the rows are evenly planted little or no trouble and delay is experienced in driving between them.

The improvements in this machine consist in providing the crank shaft, A, with a connecting rod, B, so that the slide, C, is driven back and forth through the seed hoppers, D. This slide has a recess, E, in it which withdraws the seed and deposits it in the tube, F, at each motion, so that it falls from thence into the furrow traced by the cultivator, G.

When it is desired to throw this seed-distributing device out of action it can be done by raising the lever, H. This lever commonly stands up by the driver, but is laid down here so that it can be seen. The act of lifting this lever causes the cam rod, I, to throw the gears, J, which drive the seeding device out of mesh, and it also lifts the cultivators, so that their operation is also suspended; this can be done at any time without stopping the team. When the driver backs for any purpose such as getting into position, turning around, etc., the cultivator tips up and does not work, but on starting again the pin, K, in the arm strikes against the bar, L, and holds the cultivator rigidly so that it tears up the ground again.

Another novel feature of this machine is the attachment of an arm, M, to the end of the axle opposite the reader. This arm has a foot on each end, and its use is to mark certain spots at equal distances apart during the progress of the machine. These marks occur exactly when the seed is dropped, and they serve as guides to the driver in planting a second row, so that when these marks coincide the seed is planted in regular rows across the field. The usual marker, N, is also provided.

This machine can be backed or turned very readily without deranging any part. It is under complete control, and all parts are in a small compass so that it can work close to a fence or hedge. It is made to plant the corn in squares, three feet apart, or in rows eighteen inches apart, two grains in a hill, or one grain a foot apart. Any of the alterations are made by simply putting a larger cog wheel on the driving shaft. By making a double box with another slide, it can be made to drop phosphates, guano, or whatever fertilizer is prepared, at the same time. This planter took the first premium at the State Fair held at Easton, Pa., last fall.

A patent was procured on this invention through the Scientific American Patent Agency on the 5th of April, 1864, by John Agnew, of Bath, Pa. Address him at that place.

Ferry Boat With a "Woolfe" Engine.

A correspondent, Mr. W. W. Hanscom, writing from California, favors us with the following interesting communication:—"A ferry boat called the *Louise* is running between San Francisco and Oakland, which has two steam cylinders constructed *on* the Woolfe system. One of the cylinders is oscillating, 40 inches diameter of bore, 30 inches stroke, the other 18 inches diameter and same stroke, both being connected to the same crank, and setting at an angle of about 90 degrees to one another; the small cylinder has a single slide valve and takes steam nearly full stroke, from which cylinder it escapes into the larger having a pressure of 25 pounds above the atmosphere, and from which it is cut off at half stroke by a puppet valve worked by a cam on the shaft; the oscillating cylinder has a slide valve same as the small one.

The boiler pressure is 75 pounds above the atmosphere; from the larger cylinder it goes into a jet condenser and is then thrown overboard. A large tank is placed in the hold which carries the water for the boilers, none being taken from the condenser back to the boilers; fresh water is used. The boilers have steam in them from six o'clock in the morning until about half past seven in the evening; and during this time the boat runs between 60 and 70 miles, the crank making from 32 to 36 revolutions per minute, giving a speed of about 12 miles per hour and consuming three tuns of Mt. Diablo coal during the day. The distance between landings is between five and six miles and is made usually in about 28 minutes; the boat making ten to twelve trips per day.

American Carpet Factories.

There are at the present time only about six large establishments employed in the manufacture of fine carpets in this country; while there is a considerable number of similar establishments engaged in a limited way in the manufacture of the cheaper styles of carpets. Four of the largest companies employ an aggregate capital of $6,500,000, while the aggregate annual capacity of three of them is four millions five hundred thousand yards of carpeting of various kinds. Of the four companies thus alluded to, one manufactures only Wilton and Brussels carpets and rugs, another only ingrain and three-ply, another ingrain, Venetian and Brussels, while the fourth manufactures velvet, Brussels, ingrain, three-ply and Venetian, besides a variety of rugs. One of these companies uses one million two hundred and fifty thousand pounds of wool annually five hundred thousand pounds of worsted yarn, and three hundred thousand pounds of flax or tow yarn. Another five tons of wool and two of jute and linen yarns. Another, with a capital of a million and a half of dollars, has two hundred and eighty-eight power-looms, and produces over two millions of yards of carpeting annually. In 1857, it was estimated that there were over five thousand power-looms in the various carpet factories of the United States, and there are probably many more at present. From one thousand three hundred to two thousand persons find employment in one of these large factories. The sales often reach to several million of dollars annually. During the first two years of the war the carpet manufacturers found their business better than usual, money being plenty and the people inclined to buy largely. But the unsettled state of financial affairs during the last two years has been felt in this business quite seriously. Although the present tariff almost prohibits the importation of foreign carpets, the duties on materials are at the same time so high as to vastly increase the expense of manufacturing.

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