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Scientific American

AN ILLUSTRATED

JOURNAL

of

ART & SCIENCE



MECHANICS



VOLUME XII.

NEW-YORK

PUBLISHED BY MUNN & Co.

NEW SERIES.

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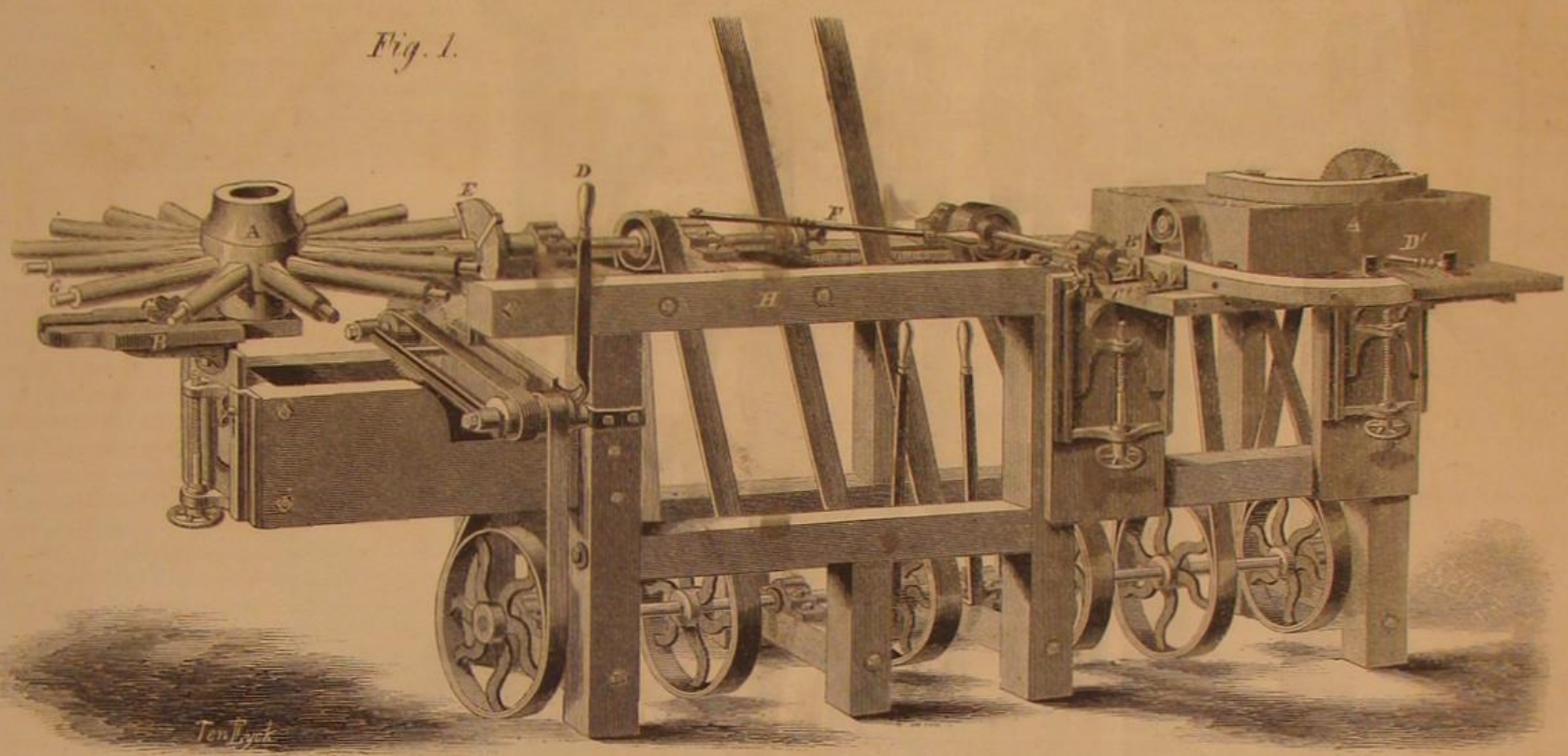
R. TENEYCK SC.

Scientific American.

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

Vol. XII.---No. 1. (NEW SERIES.) NEW YORK, JANUARY 2, 1865. $3 PER ANNUM (IN ADVANCE.)

Fig. 1.

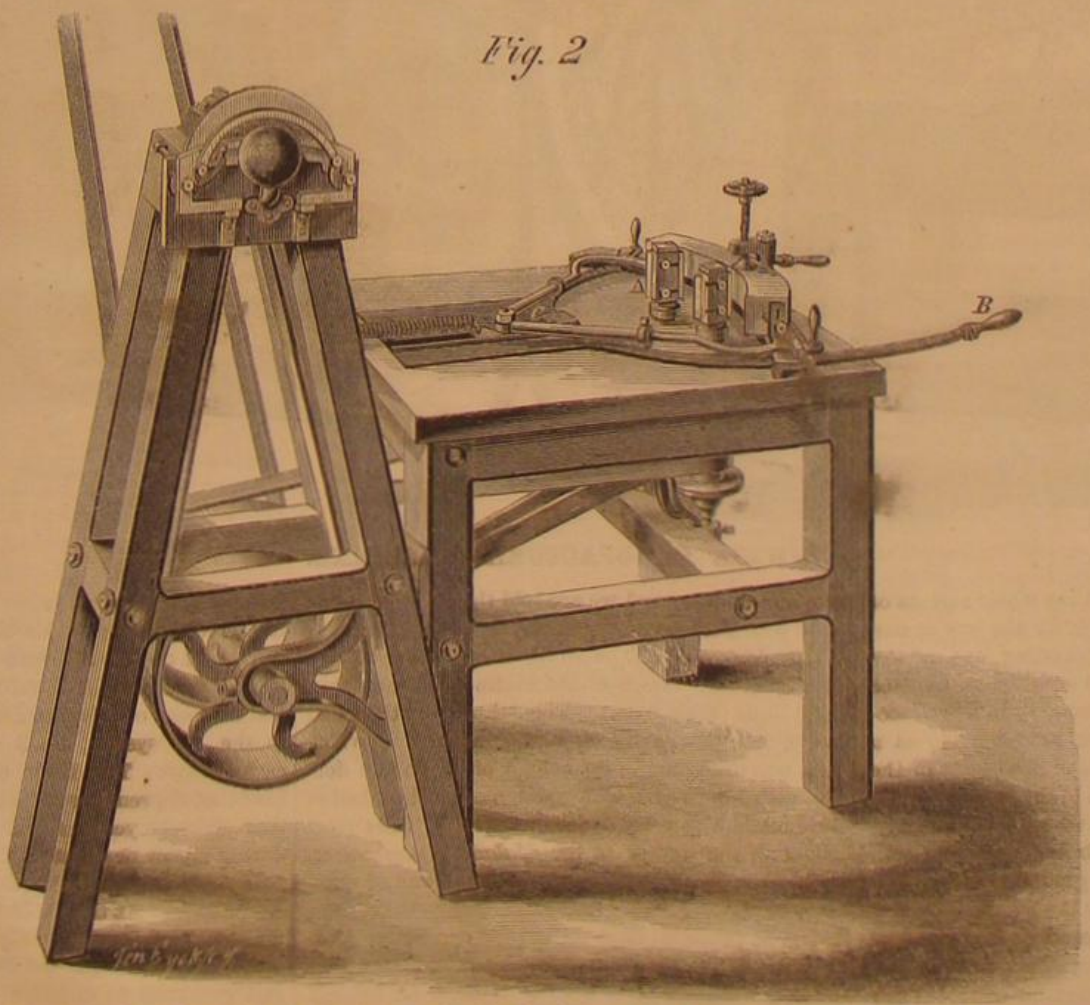


JACOB'S SYSTEM OF WHEEL MANUFACTURE.

The process of making wagon wheels by hand is a tedious and most unsatisfactory one, on some accounts, as the excellence of the finished product depends entirely upon the skill of one man. Indeed, the individual who takes the wheel in hand to perform the last touches may, by his want of skill, impair the work of better men who preceded him. There are other considerations involved which render the adoption of machinery desirable in this branch of manufacture.—The saving in time is also an important item in these days of competition.

Jacob's system of wheel-making, which is here illustrated, takes the wheel after the spokes have been inserted in the hub, as shown at A, Fig. 1, and from this stage onward entirely completes the job, so that it is in all *respects* a finished piece of workmanship. To do this duty three machines are provided. The first of them is the figure above. In this machine the wheel, A, is placed on the table, B, and fastened there by the fixtures, C, so that while it is perfectly firm it is also free to revolve on its center. A circular saw is then brought up by the handle, D, so as to cut off the end of the spoke to a certain length. This operation having been performed, the hollow auger, E, is moved up by the lever, F, and the shoulder, G, on the spoke, is also made to a specified and previously-set distance from the center of the wheel. When the fellies are put on, therefore, the wheel will be comparatively true all round, and the several parts will have a neat fit, one with the other.

Fig. 2



These details just described are all fastened to the frame, H, and are driven by the belt seen above.

At the right of the frame may be seen the appurtenances by which the fellies are fitted up. The fellies have previously been sawed out to the proper radius. The ends, however, have to be squared off, and cut to a certain length. This is done on the table, A'. By the use of gage irons, set in the table, the end of the felly is always made perfectly square with the radius of the circle it is on. The holes for the dowel pins in the end are then bored by the bit, B', and the gages, C', also guide the work so that it is perfectly true with the joint face. The spoke holes are bored with the bit, D', by the use of gages also.

After the fellies are bored they are removed to the machine seen in Fig. 2. This machine dresses the entire inner surface of the felly, rounding it off perfectly to any desired curve, and forming a handsome oval about the spoke hole. The rounded surface is given by the cutters, A, which run at a high velocity and are made of any shape desired. The felly is carried about the cutters by moving the lever, B, and there is a slot of peculiar shape in the table at C. The oval above alluded to

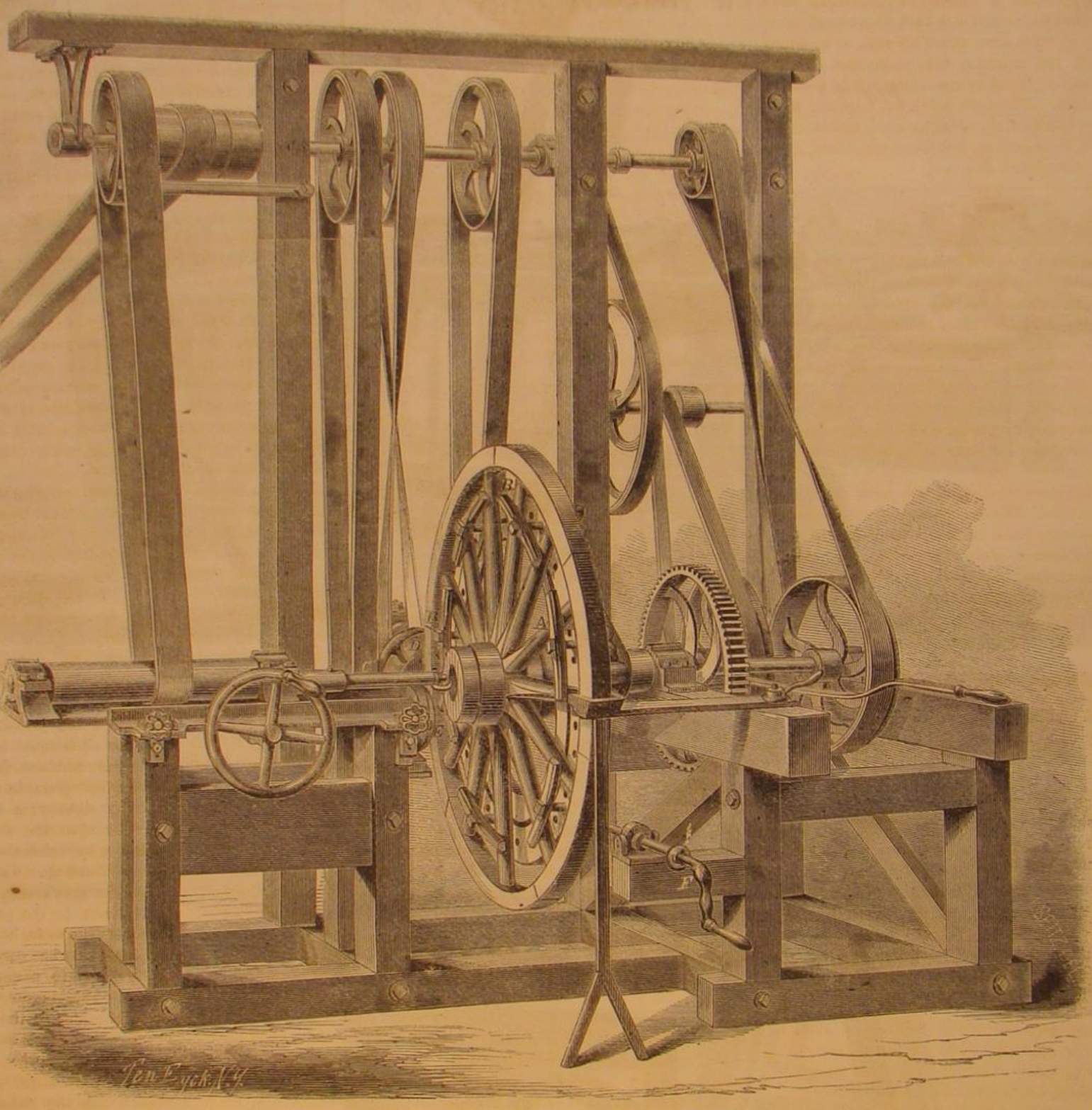
Центральна Наукова БІБЛІОТЕКА ім. Інв. № 110609

is formed by moving the fellies away from the cutters to a certain distance. Another rounding machine for bent fellies is shown in the vertical frame, D. This machine makes a perfect semicircle, leaving no flat or plane surfaces to be removed by hand afterward. The cutters can be made to work as close to the spoke holes as desirable; this feature is novel and has never before been accomplished

After the wheel is all put together, which occupies but a few minutes, so perfectly do the parts unite with one another, it is removed to the machine seen in Fig. 3. This machine dresses the whole surface of the wheel rim and bores the hole for the box at one time, and is to us the most interesting one of the series. The wheel having been chucked on the face plate, A, is fastened by the clamps, B, in a few seconds. The boring bar, C, is then set revolving at a high rate of speed, while the wheel itself runs in the opposite direction. The cutters in the head, D, then revolve against the tread of the wheel, while the cutters in the heads, E, one on each side, dress off both faces of the rim at once, being graduated as to the amount of wood they remove by the handle, F.

The result of these several operations is to produce a most beautiful wheel in a very short time. Fifty heavy wheels a day is a fair average for one set of this machinery. All the joints are perfectly true and smooth, and the entire appearance is neat and mechanical.

These machines were patented through the Scientific American Patent Agency, Sept. 15, 1863, by H. S. Jacobs, in England, France and Belgium. A company has been formed to work these machines, and some of them are now in operation at No. 147 Bank street, this city. For further information address Jacob's Patent Wheel Dressing Machine Co., 99 Wall st., New York. The entire patent is for sale.



WHEEL MANUFACTURING MACHINE.

French Bread-makers.

The trade of baker must have been in the olden time one to try the temper of the most patient of men. At one period, a Paris baker could light his oven only on 290 days of the year. He could not bake on Sundays, and we are told that it was amusing to watch the bakers standing in their doorways on Monday mornings with their ears stretched, to catch the first sound of the matin-bell, when they might light their ovens. Then there was the great trial of the Queen's bread, in the making of which yeast was used, and in the course of which the doctors, called in to give their opinion as to the effect of bread made with yeast on health, fell out, to the great delight of the author of the *Malades Imaginaires*. If, however, in all these times of trouble and of vexatious regulations, the poor journeyman baker was seldom at peace, at least he had the comfort of looking forward to the time when he might marry his master's daughter, and set up a shop for himself. But the poor journeyman bakers of to-day, who flit fretfully about in the twilight and in the dawn, have no such hope left. Capital, which they can never have an opportunity of amassing, is necessary to open a baker's shop, even now when the monopoly has been destroyed. Here he will remain where I see him now, on this bleak winter-night, in this stifling celler under the shop, with the red-hot mouth of the oven almost singeing his body, making and baking the bread of his fellow-man to the end of his short life. Little unbroken rest has he, even by day, for he must watch once or twice in the daytime the preparation for the night's batch of bread. The labor of kneading it is most unhealthy to him, driving the particles of flour into his lungs, and cannot be advantageous to the bread. Still, the Paris journeyman baker vehemently opposes the introduction of kneading machinery, in the fear that it will leave him to starve; and up to this moment he has been able to restrict the use of bread-making machinery within very narrow limits. Although his wages are low, and his hope of advancement is almost *nil*, he clings to the old system, albeit it must bring him to an early grave. The labor of a working-baker is so hard that apprentices to it are seldom entered younger than eighteen years of age. The apprenticeship lasts during a year or eighteen months, and the premium paid to the master-baker fluctuates between five and six pounds. At the expiration of this short apprenticeship, he becomes a brigadier. It is his duty to heat the oven, to put the bread in it, and remove it, and generally to exercise the functions of a foreman. In the bakery with him is the important workman called the first help. It is he who kneads the bread, sending forth, as from the bowels of the earth, the groans and piercing cries that affright the late-returning merry-makers. He shapes the dough into loaves, with the assistance of the second help.

The first help earns about three-and-sixpence per diem; and his assistant has between half-a-crown and three shillings per diem. A fourth workman generally completes the staff of an ordinary Parisian bakery. This last is the drudge; he chops the wood, fetches the water, counts the loaves, and, in short, does all the needful drudgery, for something under two shillings per diem. The poor bakers are, I may observe, paid for overwork in this way. When they have to bake more than seven batches of bread, each batch containing seventy loaves, the workmen receive fivepence each for the eighth batch, and a penny each for the ninth. In addition to these money-payments, each workman is allowed to take away two pounds of bread daily, and it is this two-pound loaf that we have so often seen under his arm, as he trots away through the morning cold to his bed. He is allowed, moreover, to eat as much bread as he pleases during the night. There are indulgent masters, who give the poor fellows a sip of white wine before they start home in the morning; but these are, I fear, rare exceptions.—*Chamber's Journal.*

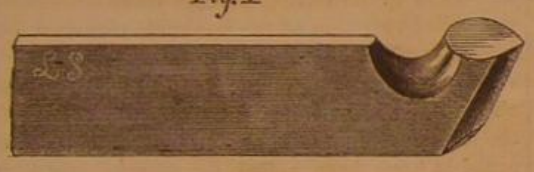
TURNING TOOLS.

PART FIRST.

There is no branch of the machinist's trade which is more interesting or important than that relating to the lathe and its management. Of two men working side by side with the same lathes, and on the same kind of work, the same feed and speed, one will do much more than the other. We see this exemplified on piece work. Here the earnings of the workman are exactly in proportion to his skill, and though his comrades may take every opportunity to discover the secret of his success, he still outstrips competitors.

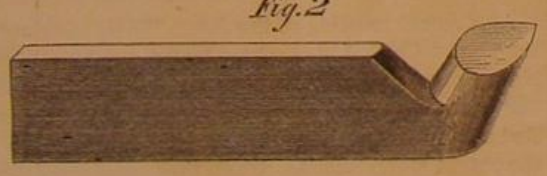
This is owing in most cases to the tools the skillful man works with. The unreflecting workman cannot appreciate some small matter in the construction of a tool, and suffers accordingly. He will most probably be contented to work with a clumsy tool, like the one shown in Fig. 1, instead of the more

Fig. 1



efficient one illustrated in Fig. 2, and he is perpetually wondering how it is that he is always behind hand.

Fig. 2



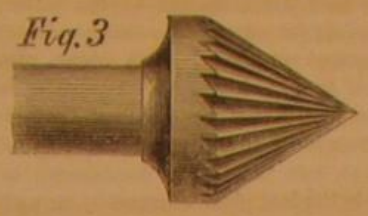
There is no mystery about the matter. A lathe tool works on one principle, as do all cutting instruments, and this principle is simply that of the wedge, as we have remarked in a previous article on boring tools, in the last volume of the Scientific American.

If a man has a heavy stone to raise, or a tough block of wood to split, he does not take a wedge which is thick and blunt, and almost as wide at the base as it is long. He uses instead a long, thin and easy one, which does the work with facility and celerity. The case is exactly the same when we cut iron or metals of any kind. To sever the fibers or crystals we must have sharp thin-edged tools, as thin as they can be made with economy. With these, and proper feed and speed, the work will be well done if intelligence superintend the operations. It is most essential that the tools be made sharp and kept so. If they are not, the work will be poorly executed. It is also of the first importance that the work be truly and properly centered. The center is the point on which the accuracy of the whole job depends, and it will be apparent to even the unprofessional reader that it should be perfect.

Very many workmen are content to take a center punch and make some sort of a cavity in the end of the rod, and "let it go at that," as the saying is. No good workman does this, but shiftless and indifferent ones do, and their work always shows badly compared with that done in a proper manner.

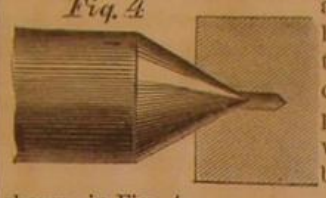
Every center should be drilled. The drill need not be larger than the tenth part of one inch, in ordinary work, and the object of drilling is to keep the point of the center in the lathe from bottoming. The centers in the work should be enlarged with a countersink, like the one shown in Fig. 3. But when the

Fig. 3



shaft is too heavy to be used in this way a square center is put in the place of the dead center of the lathe, a dog put on the shaft, and the job set revolving. The back end of a tool is then put in the tool post and screwed up tight, and the tool brought in contact with the running shaft. If the work has been drilled properly the sharp square corners make a countersink like the head of a screw, so that when the working center of the lathe is put in the spindle it will have a fair, solid bearing in the job, as shown in Fig. 4.

Fig. 4



The way a center, made with a center punch alone, acts, is shown in Fig. 5. Even if the punch is ground to an exact conformity with the lathe center, which is by no means likely, the center will not be true, as a rule, when the work is run over many times. For as the work revolves the orifice in the end of the shaft wears, where it bears on the lathe center. When the center comes to the bottom of the cavity, as it soon will, it stops there because its point can go no farther, while the larger or outer diameter of the centers wear away on the lathe center. This causes the work to be untrue; when a rough cut is taken off from the shaft and a finishing cut is to follow, the work runs "out," and not only spoils the looks of the job by leaving rough marks in one side, but ruins the work, for it is not round, and can never be made to fit in its place. There are many ways of making countersinks for enlarging centers. One commonly used, quite as efficient, and much cheaper than the former one, is shown in Fig. 6.

Fig. 5

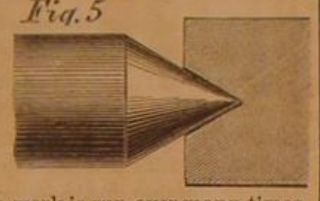
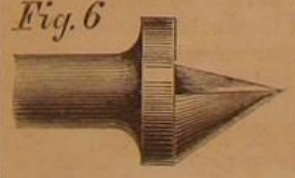


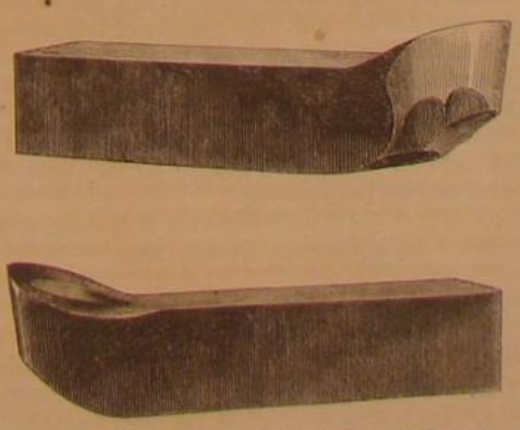
Fig. 6



Having thus made a brief but necessary digression from the subject of turning tools, let us resume the consideration of them.

The tool shown in Fig. 2, is a good roughing tool; it is called a diamond point, but there are very many turners who do not consider it the best for the purpose. It would be hard to say *why* precisely, for there is sometimes a great deal of whim exhibited in

Figs. 7 and 8.



the matter of tools. Men will use, in spite of argument or reason, the tools they have been in the habit of employing, and prefer them to all others, even when they know they are not so good.

The cutter shown in figures 7 and 8 is a most excellent one; its virtues have been well tried and not found wanting. It is stout, cuts well, when properly made, holds a good edge, and will carry a heavy or a light cut with equal facility. These are the chief requisites of a good roughing tool. The management of it depends on the workman.

EXPANSION OF STEAM.

To the Editors of the Scientific American:—

Gentlemen,—

As I see that in the Scientific American of the 15th of October, you make some reference to a work of mine, I beg leave to make the following remarks on the subject of your article.

The circumstances under which steam undergoes expansion may be classed under five heads:—I. When the steam expands without performing work. II. When it expands and performs work, the temperature being maintained constant by a supply of heat from without. III. When it expands and performs work, being supplied from without with just enough of heat to prevent any liquefaction of the steam, so that it is kept exactly at the saturation point. IV. When it expands and performs work in a non-conducting cylinder. V. When it expands and performs work in a conducting cylinder, not supplied with heat from without.

I. When steam expands without performing work (as in rushing out of a safety-valve or through a throttle-valve) it becomes superheated, as is well-known; the temperature falling very slightly in comparison with the boiling-point corresponding to the diminished pressure. The precise rate at which the temperature falls is not yet known; but it will probably be soon ascertained through some experiments by Prof. Thomson and Mr. Joule.

II. When steam expands and performs work, the temperature being maintained constant by supplying heat through the cylinder, the law of expansion at first deviates from Mariotte's law by the pressure falling *less rapidly* than the density; but as the expansion goes on, the law approaches more nearly to that of Marriotte, as recent experiments by Messrs. Fairbairn and Tate have shown.

III. When the steam expands and performs work, *being maintained exactly at the temperature of saturation*, the law of expansion, as you observe, is perfectly definite. In the treatise to which you have referred I have shown what it is; and also that it is expressed nearly enough for practical purposes by taking the pressure as being proportional to the 17th power of the 16th root of the density; a function very easily calculated by means of a table of squares and square roots. In many actual steam engines, the circumstances of this case are practically realized, as is shown by the agreement of their performance with the results of calculation

IV. When steam expands and performs work in a non-conducting cylinder, it was shown by Professor Clausius and myself, in 1850, that the lowering of the temperature, through the disappearance of heat in performing work, goes on more rapidly than the fall of the boiling point corresponding to the pressure, so that part of the steam is liquefied. This result was experimentally verified by Mr. G. A. Hirn, of Mulhouse, a few years afterwards (see his Treatise on the Mechanical Theory of Heat). The mathematical law of the expansion in this case can be given with perfect precision; but its circumstances are not accurately realized in practice, because the cylinder is always made of a rapidly-conducting material.

V. Lastly, when the steam expands and performs work in a conducting cylinder, which receives no supply of heat from without, but is left to undergo a great alternate rise and fall of temperature through its alternate connection with the boiler and the condenser, the law of expansion becomes very variable, and the problem of determining it extremely complex. It is certain, however, that a great waste of heat occurs in every case of this kind, as Mr. Isherwood's experiments have shown. In a paper read to the Institution of Engineers in Scotland, about two years ago, I discussed some of Mr. Isherwood's earlier experiments, and showed that they gave proof of a waste of heat increasing with the fall of temperature due to the expansion of the steam, with the extent of conducting surface of the cylinder, and with the duration of the contact between the hot boiler steam and that conducting surface.

As to the value of indicator-diagrams, I have always held that they gave a good approximation to the whole *work done* by the steam during each stroke, though not to the pressures at particular instants, which, in ordinary indicators, are affected by oscillations and other disturbing causes; but that defect I consider to be nearly, if not entirely, overcome in the indicator of Mr. Richards; and I hope for very valuable results from the extension of its use.

W. J. Macquorn Rankine.

Glasgow University, Nov. 18th, 1864.

SEASONING OF LUMBER AND TIMBER.

[For the Scientific American.]

It is evident that the seasoning and drying of lumber is not properly understood by the community. If there ever was a time in which the best mode was needed it is now. Every manufacturing establishment in the country is taxed to its utmost capacity, and must, for years to come, to supply the demand for buildings, carriages, wagons, reapers and mowers, rail cars, bridges, sash blinds and doors, cabinet, cooper, chair, tub and rail, and other work, with gun carriages, gun stocks, pianos, melodeons, organs, ships, etc., all of which require seasoned lumber.

The question is, how can this seasoned lumber be obtained, when the demand for lumber follows close to the saw? Indeed, it is very difficult to manufacture lumber as rapidly as it is needed for immediate use.

Four years in the open air is none too much time to prepare even two-inch lumber for good work. Oak lumber, such as is used for gun carriages, car sills, etc., will not be properly seasoned by an exposure to the air for ten years, while a large portion of it will be destroyed by eramacausis, or dry rot, long before that time. I have extracted at the rate of over 600 pounds per M feet, board measure, from this kind of lumber that had been dried under cover 19 years, and at the same time caused a shrinkage in its size of $\frac{1}{4}$ inch to the foot.

I have made the seasoning and drying of lumber a study for more than eighteen years, and I now propose to make a few suggestions, in a sufficiently brief manner to come within the rule of brevity which you have adopted, and if the matter is not sufficiently explicit for your readers I will answer inquiries by mail.

To season lumber is to coagulate its vegetable albumen, and render it insoluble in cold water. Lumber may be seasoned and not dried, and dried and not seasoned. It requires both to be perfect.

All wood contains albumen more or less. This albumen is precisely like the albumen of the egg, except a trace of sulphur in the egg. If this albumen is simply dried in the air it will shrink and swell with every change of atmosphere. Common air drying will never fix albumen, nor will it in any length of time perform the most thorough shrinkage. Cold water, hot air, and steam may extract albumen, and the air may do the drying. But all lumber and timber is injured in its strength and in its beauty of finish by the loss of its albumen. The albumen properly coagulated and left in the pores of the lumber is as valuable as paint or varnish for its preservation or beauty of finish. Besides, no lumber that has lost its albumen by soaking or steaming can ever be reduced by air drying to its smallest possible size, since the air dries the outside first and forms an enamel that will not further shrink when the inside becomes dry. It must all shrink together, in order to make the lumber solid for a fine finish. If the pores of the lumber are dried open it cannot make a good finish.

Now, what seems to be desirable, is, to be able to put a tree in the forest, manufacture the lumber, season it thoroughly, dry it sufficiently to reduce it to its smallest possible size, and be able to manufacture it into anything, from a clothes-pin to a ship, during the same week it is taken from the stump.

I have discovered precisely such a mode, and can now direct or show any one, so that they can have better seasoned lumber in a week than they can make in the air in a week of years. And what is still more surprising, it has the following rare combination of qualities, to wit: greater rapidity, more thorough seasoning and drying, and cheaper than any other process known to science, whether natural or artificial. If needs be, the whole may be creosoted for its preservation, at the same time, and at a merely nominal expense.

The process is simply the use of superheated steam—superheated in particles, or one particle at a time—and used in a moderately tight room, requiring no more pressure than simply to balance the atmosphere and exclude the air. This steam may be made from the moisture of the drying substance, or in any other cheap and convenient way, to be used in the place of air for conveying caloric to the substances to be seasoned or dried. This steam also keeps the pores of the lumber open, penetrates to the center without forming an enamel on the outside, and when the whole is sufficiently hot the lumber is not only seasoned, but the drying commences at the center, which is the last place reached by any other mode of drying, if, indeed, it is ever reached at all by such modes. Besides, steam has 90 times the power of motion and absorption that common air has. Steam also holds 1,000 degrees of latent heat, which assists in preventing waste of fuel. When this process is properly arranged and managed there is scarce a possibility of any escape of heat, unless it be in the steam generated from the drying lumber, and which only passes out when it is in excess in the drying room. It will, therefore, readily be seen that lumber which is continually surrounded by such a steam atmosphere cannot be dried in one part more rapidly than it can in another, and must shrink alike.

By this process the shrinking of the lumber is all done before the lumber is entirely dry, and the more moisture there can be left in any lumber, after the seasoning and shrinking are completed, the stronger, tougher, and more durable the timber. This process, therefore, is capable of seasoning and shrinking the lumber, and still leave more moisture in it, or it may leave it drier than any other mode.

Having already expended nearly $200,000 in experiments with this new principle of seasoning and drying lumber, grain, flour, meal, fruit, vegetables, tobacco, salt, wool, flax, etc., I should be pleased, if I had the time and room, to give you the result of experiments with each, such as the drying of flax in an hour directly from the water-rotting tank, so that it will dress better in any machine than by air-drying any length of time, but this article would soon be too long to come within the sensible rule of brevity established by the Scientific American.

H. G. Bulkley.

Cleveland, Ohio. Dec. 14, 1864.

Water Engines in Europe.

Messrs. Editors:—I notice in your last issue a reply of yours to a correspondent, saying that you see no reason why water should not be made to act by direct pressure, and that there existed such an engine in Washington. Lest your correspondent should go to all the trouble, work and expense of re-inventing this motive power, I wish to inform him, through your columns, that there are dozens of these engines in operation in Germany, Belgium, France and England, and that I for one have the drawings of several kinds of these water column engines as they are called. I have also seen one in operation; this was near Berchtesgaden, Bavaria, in the salt mines. This engine had been running continually, with hardly any repairs, for over thirty years, with only one and the same old man to attend to it all that time. It was used to pump the brine over a hill of several hundred feet in hight. As engines of this sort work necessarily very slowly, only three or four strokes per minute, they are peculiarly adapted for driving pumps, for which work they are considered the best motive power when there is a sufficient fall of water on hand to drive them, and so far they have been used for that purpose only.

Clemens Herschel, C.E.

No. 6 Joy's Buildings, Boston, Mass.

Work on Cotton Spinning Wanted.

Messrs. Editors.—Please to inform me of the best work on the practical operation of cotton machinery. I have a work entitled the "American Cotton Spinner," but it does not explain the point I wish to understand, which is:—Suppose a man was about to start a mill; he wishes to produce cloth that shall weigh four, five or six yards to the pound, that will require a certain number of yarn according to the sley and pick of the goods. Now, what weight of cotton shall be spread on a given space on the lapper apron, so that after it has passed through the different machines with whatever draught they may have, the result shall be the number of yarn required? If you know of any work thorough enough to explain those points, please to inform me. J. H. H.

[Perhaps some of the cotton spinners among our readers will answer this.—Eds.

An Iron Letter by Post.

The Birmingham correspondent of the London, *Engineer* says :—

"An original specimen of iron-rolling was placed in the Midland Institute, in Birmingham, by the proprietors of the *Birmingham Journal and Post*. It is no other than a letter written upon iron, rolled so thin that the sheet is only twice the weight of a sheet of ordinary-sized note paper of the same surface dimensions. It weighs two pennyweights and twenty one grains. Tested by one of Holtzappfel's gages, the thickness of the sheet is found to be one-thousandth part of an inch. A sheet of Belgian iron, supposed, hitherto, to be the thinnest previously rolled, is the six hundred and sixty-sixth part of an inch thick ; and the thickness of an ordinary sheet of note paper is about the four hundredth part of an inch. The letter, which is dated, 'South Pittsburgh, Pa., November 6, 1864,' explains the object of the manufacturer. It runs thus:—'*To the Editor of the Birmingham Journal*—Sir : In the number of your paper dated October 1, 1864, is an article setting forth that John Brown & Co., of the Atlas Works, Sheffield, has succeeded in rolling a plate of iron 7 feet long, 6 feet wide, and 13½ inches thick. I believe that to be the thickest plate ever rolled. I send you this specimen of iron made at the Sligo Ironworks, Pittsburgh, Pa., as the thinnest iron ever rolled in the world up to this time, which iron I challenge all England to surpass for strength and tenacity. This, I believe, will be the first iron letter that ever crossed the Atlantic ocean; and if you should think it worthy of notice in your widely-circulated paper, please send me a copy of the same.—Yours, &c., John C. Evans.' Fourteen years ago some iron was rolled very thin at the Bankfield Ironworks, Bilston, and afterwards bound up as a book ; and previously to the rolling of the Belgian iron referred to above, and shown at the Exhibition in 1863, it was the thinnest iron which, up to that time, was supposed to have been rolled, for it was only a little thicker than ordinary note paper, but it could not compare with the specimen which our American friends have turned out."

The Patent Stone Bricks.

At a recent meeting of the South Wales Institute of Engineers, Capt. J. J. Bodmer read a paper "On the Nature and Manufacture of Patent Stone Bricks." The writer described the process adopted by Messrs. Bodmer Brothers, Newport, in the manufacture of the patent stone bricks. When they considered that labor was now about 100 per cent. higher than it was about eighty years since, anything which tended to lower the price of so useful and general a commodity as bricks, must be considered a timely invention. The stone bricks, he said, had fulfilled these requisites. Another very great advantage which these stone bricks had over the common bricks was, that they improved by age; whereas the common bricks skinned and deteriorated. Some of the bricks were exhibited to the members. Some had been made of Aberthawe lime and sand; others of sand and cinders; and some others had been made out of slags, which were particularly hard and durable. Some of the bricks made by the patent process were stated to have borne a weight of three tuns per brick, after having been made but fourteen days; others, which had been longer made, were capable of bearing about thirty tuns per brick. The chief difficulty in the manufacture was that of reducing the material employed to the fineness of sand, or, better, to that of powder.

A Mr. Alex. Cuthell, of Doncaster, England, sends a tracing of a slide valve and cut off to the *Engineer*, said cut off being operated by the governor. The arrangement is not new, having been used in "Boyden's" engine in this country for many years.

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:—

Shaft Coupling.—This invention relates to a new and improved coupling for shafting, and it consists in the employment or use of a divided collar, provided with one or more screws or screw threads and conical surfaces on its exterior, in connection with nuts and female cones, or thimbles having conical interiors to work on, the conical surfaces of the divided collar all being arranged in such a manner that shafting may be securely connected with the greatest facility, and also secured together in line, one shaft with another, thereby avoiding much trouble hitherto experienced in putting up the shafting of machinery. James P. Collins, of Troy, N. Y., is the inventor.

Turning Machine.—The object of this invention is an improvement in that class of machines which are intended to turn automatically conical or other articles of a regular or irregular form, and of variable diameter. The invention consists in the application for the purpose of feeding the stuff to be turned of a screw-thread cut in the guide, either in front or behind the roughing-out tool, in such a manner that the stuff on entering the guide will work into said screw-thread, and by its action will be fed to the tool for a distance corresponding to the pitch of the thread, at each revolution which it makes, and a quick, automatic and uniform feed is effected. It consists further in the use of a forked guide made to straddle the roughing-out tool, and to spring open in such a manner that the stuff is securely guided on both sides of said tool, and by throwing the jaws of the guide open any impurities lodging in the guide holes can be readily removed, and when the jaws are closed upon the stuff the feed screw bites into the surface of the same, and causes it to be fed without further attention of the operator or attendant. It consists further in the employment of a rotating cam acting on the slide rest, in which the finishing tool is secured in such a manner that by the action of the said rotating cam the motions of the finishing tool and the shape of the article to be turned is governed. Finally, in securing the cutting-off tool in a sliding head, rendered yielding by the action of a spring, in such manner that said cutting-off tool is enabled to act, while the stuff is continually fed along by the action of the feed screw. Chas. G. Bloomer, of Wilkford, R. I., is the inventor.

Match Machine.—This invention consists in the employment or use of one or more hoppers filled with cards, in combination with a suitable feed apparatus and set of knives, in such a manner that one card after another is taken from the hopper automatically and exposed to the action of the knives, to be cut up in single strips of the requisite thickness; also in taking the cards from the bottom of the hopper or hoppers, so that the same by their inherent gravity are brought in the requisite position to be fed to the knives, until the hoppers ars exhausted; further, in arranging the knives in sections, separated from each other by suitable intervals so that each card is cut up separate, and the match stick so cut can be easily kept in separate tiers, and the feeding to the rack is facilitated; also, in the use of guides in front of the knives, and placed opposite the intervals between the several sections, to keep the match sticks in separate distinct tiers; further, in the employment or use of a rack, to which an intermittent motion is imparted, in combination with the guides, the knives and the feed apparatus, in such a manner that one tier of matches after the other is automatically pushed between the slats of the rack, as the same arrive successively in a position opposite the table; also in the application to the slats of two or more elastic bands or springs placed round said slats, at suitable intervals, in such manner that they hold the same together with a yielding pressure, and the frames are enabled to hold the match sticks, and to accommodate themselves to sticks of different size and thickness; finally, in subjecting the match sticks, after they have been passed between the slats of the rack, to the action of combs or other suitable device, in such manner that the same are automatically slipped, or, in other words, that the alternate sticks are pushed out in opposite directions, to keep their ends separate while dipping. Emory Andrews, of Springfield, Mass., and Wm. Tucker, of Uxbridge, Mass., are the inventors.

Wind Wheel.—The object of this invention is to obtain a cheap, safe, and reliable mechanism for obtaining power from the wind, designed more especially for driving light machinery for household or domestic purposes, such as churns, washing machines, grind-stones, wood-sawing machines, etc. The invention consists in combining with a wind wheel, of novel construction, a mechanism provided with a weight; all being arranged in such a manner that the wind wheel, when in operation may raise the weight, and render the mechanism aforesaid available as a motor which may be used when there is no wind and the wind wheel consequently inoperative. Robert S. Smith, of Stockport, N. Y., is the inventor.

Railroads.—This invention relates to a new and useful improvement in what are generally termed sheet railroads, and it consists in constructing the rails with indentations in their edges, so as to form a series of short inclined planes at both sides of each rail to enable the wheels of common vehicles to release themselves from the track or pass over the rails when approaching them obliquely. Great difficulty is now experienced in getting the wheels of common vehicles over the rails, when presented obliquely to them, and when the wheels are inside of the rails they are frequently materially injured and strained in crossing the latter, in consequence of the barrier the rails present to them. A difficulty which is fully obviated by this invention. Theodore M. Schleir, of Nashville, Tenn., is the inventor.

Casks.—This invention relates first, to a means employed for preventing the cask being injured by the removal of the bung. The ordinary wooden bung, as is well-known, requires to be started or loosened by striking the stave in which it is fitted by means of a mallet or hammer, and this operation after being repeatedly performed injures and breaks or splits the stave. To obviate this difficulty is one of the objects of this invention, and to effect such result a portion of the stave in which the bung is fitted is constructed of metal, and fitted between the wooden parts in a firm and substantial manner. The invention relates, second, to an improved means employed for applying a faucet to the cask, whereby the former may be inserted in the head of the latter, with the greatest facility and without the slightest danger of the escape of any portion of the liquid contents of the cask or gases contained therein. Frederick Acker, of San Francisco, Cal., is the inventor.

Steam-Engine Governor—This invention consists in a spindle furnished with spiral blades or wings rotating in a cylinder containing oil or other liquid, and a spring or weight applied to the said spindle to press it longitudinally in one direction. The pressure of the faces of the blades against the liquid caused by their revolution, tends to produce a longitudinal movement of the spindle in the opposite direction to the pressure of the spring, such tendency being greater or less according to the velocity of revolution, and the spindle being connected with the regulator of the engine or motor, its longitudinal movement is made the means of operating upon the regulator to govern the movement of the engine or motor. J. T. Rich, Rahway, N. J., is the inventor.

How Magnesium is Made.

The process by which Mr. Sonstadt produces the metal is as simple as it is ingenious. The lumps of the carbonate of magnesia are placed in large earthen jars with a quantity of muriatic acid. The solution thus obtained is drawn off when clear, and mixed with a solution of chloride of sodium, or potassium. This mixture of magnesium and the alkaline chlorides is subjected to heat in porcelain basins until the moisture is evaporated. The dried mass remaining is fused in a platinum crucible, and when poured out is technically known as "material." To deal with this a furnace is required, and the aid of sodium, which has already enabled chemists to obtain one of the latest metallic contributions to civilization—namely, aluminum. So important is the part played by sodium, that upon its price almost entirely depends the cost of magnesium. To make the latter cheap enough to be generally useful, it will be necessary to discover some less expensive mode than the present of obtaining sodium, and that it is to be hoped will be done shortly. The material is submitted to heat in an iron crucible to liberate the magnesium. The metal thus obtained is still unfit for commerce, being brittle and unworkable. It is purified by distillation in closed vessels, somewhat upon the principle of mercury distillation from cinnabar. The finished metal is brought into the form of wire, in which state it has alone been used hitherto, by forcing through a small orifice by hydraulic pressure. Inasmuch as sodium and magnesium are not unfrequently found in sea water in proportion which would not be inconvenient in the manufacture of magnesium, it is to be hoped that at no distant period a mode of extracting the double chloride from the water direct will be discovered, for there can be no doubt that if cheap, a variety of purposes to which the metal could be applied would speedily be discovered.—*London Mining Journal.*

Manufacture of Aluminum.

The alkaline metals have hitherto been considered the only agents for reducing the chlorides of aluminum, but Mr. N. Basset, of Paris, has discovered that the metalloids and metals which by double decomposition will form chlorides more fusible and volatile than the chlorides of aluminum may be employed for reducing these latter. For instance—arsenic, boron, cyanogen, zinc, antimony, mercury, and even tin, may be used, and also the amalgams of zinc, antimony and tin. The inventor prefers to use zinc, owing to its low price, its facility of application, its volatility, and other useful properties. The zinc should always be added in excess in the proportion of, say, four of zinc to one of chloride of aluminum. When this latter is brought into the presence of zinc at a temperature of from 250° to 300° centigrade, a chloride of zinc and free aluminum is obtained. This latter will dissolve in the excess of zinc, and the chloride of zinc combining with the chloride of sodium, the mass becomes thick or pasty, and then solid, while the alloy of zinc and aluminum remains liquid. If the temperature of the mass is again raised it all becomes liquid again, and the zinc reduces another proportion of chloride, and the excess of zinc becomes enriched with an extra quantity of aluminum. The rich alloy is again melted with the addition of more chloride of aluminum, and kept well stirred or agitated, until nearly pure aluminum, with only a small per centage of zinc, is obtained. This is again melted at nearly a white heat, until the remaining zinc is volatilized, and pure aluminum remains.

Libraries for Soldiers in the Field.—A laudable enterprise has just been undertaken by the Christian Commission and is being practically carried out, viz:—to provide libraries for our soldiers in the field. In order to secure 300,000 volumes of good choice books every friend at home is asked to purchase and send one or more to the Christian Commission as a New Year's gift to the soldiers. They will be assorted and forwarded to the proper quarters under the care of the agents of the Commission.

An immense telescope has just been completed for the Chicago University. The object glass is worth $11,187, and required two years for its completion, by Mr. Alvan Clark, of Cambridge, Mass. The telescope weighs 6,000 pounds, the length of the great tube being eighteen feet, and the magnifying power ranging from eighty to eighteen hundred. The entire cost of the instrument was $18,187; the cost of the observatory $25,000.

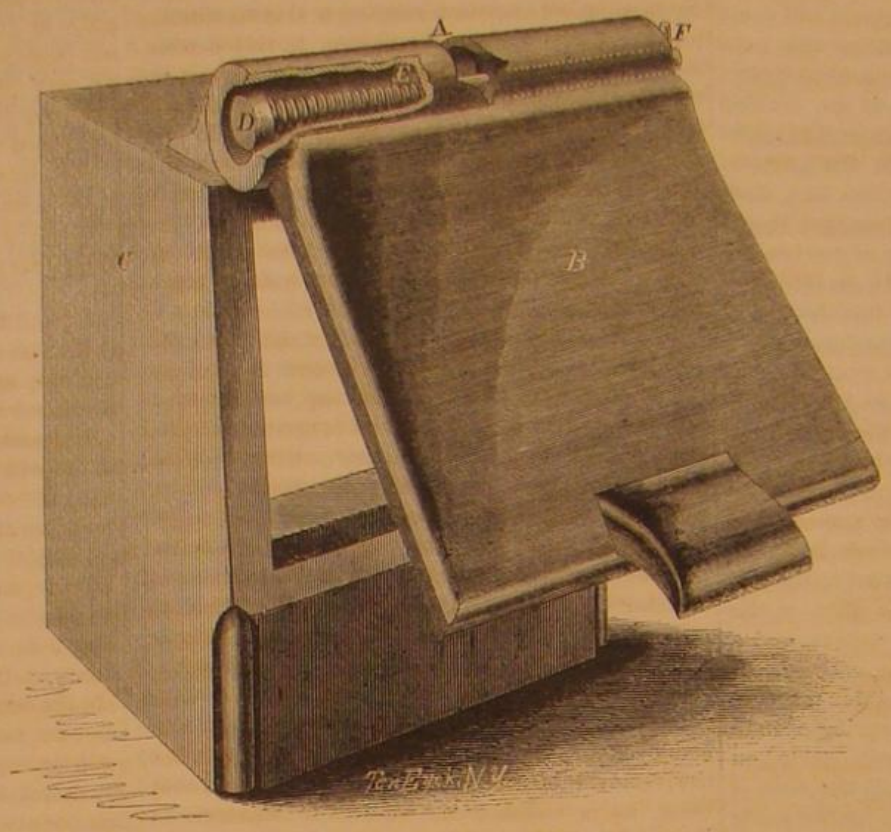
A dentist wishes the press to correct the statement, made on Horace Walpole's authority, that alum is a preservative of the teeth. He says it is on the contrary one of the most destructive agents with which the teeth can come in contact.

Eclipses.—Next year there will be four eclipses—two of the sun and two of the moon. The eclipses of the sun occur on the 25th of April and the 15th of October; those of the moon on the 11th of April and the 3d of October.

The British war corvette *Scout* has been selected by the Admiralty to have her midship sides protected by means of chain cable, in a plan similar to that adopted by the United States steamer *Kearsarge*, when in action with the *Alabama*.

Improved Axle Box.

The common axle boxes in use on railways are very inconvenient things, as regards the covers. On most of them a screw wrench must be used before they can be oiled. These screws are continually jarring out, or breaking off, so that the covers are lost on the road, and have to be renewed very often. In the box here shown no screws are employed, the casting being solid and the cover kept down by a cam-shaped hinged joint, A. This joint is halved in the center, one wing being on the cover, B, and the other on the box, C. A bolt, D, having a spring, E, slipped over it, fits the projection on the box, and by means of a pin, F, in the opposite end, draws the cover up to the box and holds it fast in either position, open or closed. The cover is shown partly raised in the engraving, and the lug on the box is broken out to expose the springs. This is a very useful improvement, as it is durable, efficient and free from the objections which attach to screws. A patent is ordered to issue on it through the Scientific American Patent Agency, by S. T. Shelley, of Louisville, Ky.; for further information address him at that place.



SHELLEY'S AXLE BOX.

THE RUHMKORFF COIL.

On the 23d of February 1852, the Emperor of the French offered a prize of 50,000 francs to be bestowed, after five years, to the author of the most important discovery concerning the applications of electricity, and a commission, composed of thirteen of the most eminent men of science in France, was appointed to award the prize. In 1857, the commission reported that they had not judged any discovery sufficiently eminent to receive the large reward, and prayed that the time might be extended for five years more. The last number of *L'Invention* contains a long report of the Commission, signed by M. Dumas, the President, awarding the prize to M. Ruhmkorff, the inventor of Ruhmkorff's coil.

The report says, "M. Ruhmkorff was a workman for some of our best constructors of instruments of precision, and finally chief, in his turn, of a house, the celebrity of which increases and extends each year. His education was made little by little, by reflection, by the study of a few books meditated without ceasing, and by the lessons of a few professors, heard, as it were, by stealth, at very rare hours of leisure. Modest in his life, of a perseverance which nothing could distract, of an abnegation which merits the most illustrious testimonials of esteem, M. Ruhmkorff will remain as a type worthy to serve as a model to those numerous intelligent workmen who people the workshops of precision of the capital."

As we have recently promised to a correspondent an explanation of the Ruhmkorff coil, we will give it in this connection. If two wires are placed parallel and near each other, and a current of electricity from a galvanic battery is passed through one of them, at the instant when the current commences there is a momentary current through the other wire in the same direction. This secondary or induced current immediately ceases, although the primary current is continued. But if the primary current is broken, another wave passes through the parallel wire but in the opposite direction.

If the wire for the primary current is wound in the form of a helix, and a finer wire, properly insulated, is wound in a second helix around the first, the force of the induced current is greatly increased.

All of these facts were discovered by others than Ruhmkorff; his invention consists in a device for breaking and renewing the primary current automatically, so that the machine would give a succession of induced waves through the outer helix without any manipulation. His plan is exceedingly simple. He cuts the primary wire and attaches to one of the cut ends a hammer of soft iron, which rests upon an anvil connected with the other cut end. Thus the circuit is closed, but can be broken by raising the hammer. He now places in the axis of the helix a bundle of soft iron wires, with their ends just over the hammer. When a current of electricity is sent through the helix, it makes the wires magnetic, and the hammer is attracted upward; breaking the current. On the breaking of the current, the wires cease to be magnetic, and the hammer falls; again closing the circuit. When the machine is properly constructed the current is thus automatically broken and closed several hundred times in a minute.

The induced current of the Ruhmkorff coil combines the large quantity of galvanic with the high intensity of frictional electricity, and in this consists its value for many scientific and industrial purposes.

SQUIRE'S FRUIT JAR.

During the last summer articles on preserving fruit



were published in the Scientific American which pointed out defects in the present jars, and hinted at improvements which would make them much better The jar here illustrated is, we are assured by th inventor, one result of our suggestions, and othe readers may take the hint thus thrown out, and ac upon it with advantage to themselves.

This jar provides against any cavity or space above the fruit. It is well known to all practical persons that heat expands the bulk of the fruit so that when cold the contents shrink and leave a space above which is detrimental. Mold accumulates on the top of the fruit and destroys its commercial value as well as the flavor. To provide against this defect the jar must be filled, as the fruit shrinks, with sirup, so that when at a moderate temperature no cavity will exist.

The method of doing this will be understood by perusing the description. The fruit is first scalded, or not, as desirable, and put in the jar; after which the cap, A, is pushed down to its place. There is a rubber gasket between the cap and the jar, so contrived that the fruit does not come in contact with it, which makes an air tight joint between the two glass surfaces. The fruit in the jar is then brought to the boiling point by being placed in a common boiler heated gradually. The fixed air remaining in the jar is expelled through the small hole, B; and the clamp, C, which works on a strong glass stud, D, is shifted round until the holes are covered; the clamp has a rubber ring, E, slipped over it, which keeps the surfaces below it air tight, and its ends work in a scroll groove in the neck of the jar. The jar is then removed, and as the contents fall by shrinking, additional sirup is poured in through one of the orifices, the air within escaping by the other. In this way the jars are filled to the very top, and no mold accumulates.

Another good feature in this jar is the application of the points, E, to the bottom. All persons who have canned fruit must have noticed a propensity in the jars to upset when the water surrounding them boils. This is occasioned by the confined air under the bottoms which, in seeking to escape, oversets the jar unless care be taken to prevent it. The jars are also frequently broken at the bottom from being taken out and set on colder surfaces, the difference in temperature cracking the glass quickly. Both of these defects are obviated in this jar, for the space beneath allows the air to escape, and the slight surface presented by the points permits the vessel to be set any where with impunity; they also strengthen the bottom.

The combination of these several features should make a most excellent fruit jar, and we predict for it a large sale when its virtues become known. It was patented through the Scientific American Patent Agency, on Oct. 18th, 1864, by John J. Squire, of Windsor Locks, Conn. For further information address him at that place.

NOTICE TO SUBSCRIBERS.

Hereafter, until further notice, the price of the Scientific American will be as follows:—When sent by mail, $3 per annum; $1 50 for six months; $1 for four months. When delivered in the city by carriers, $4 per annum. Single copies at the publication office and at periodical stores, 8 cents each. The postage on the paper by mail is 20 cents a year, payable quarterly in advance at the post office where received.

The Hecker and Waterman Experiments.

It will be remembered that to complete the programme laid out by Mr. Waterman at the commencement of his experiments, one series of 4 experiments of 30 hours each was yet wanting. There has been a delay in repairing the engine before completing this series, but we learn from Mr. Waterman that the engine is now in order, and that the experiments will soon be finished.

THE

Scientific American.

MUNN & COMPANY, Editors & Proprietors.

PUBLISHED WEEKLY AT
O. 37 PARK ROW (PARK BUILDING), NEW YORK.

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

☞ "The American News Company," Agents, 121 Nassau street, New York.

☞ Messrs. Sampson Low, Son & Co., Booksellers, 47 Ludgate Hill, London, England, are the Agents to receive European subscriptions or advertisements for the SCIENTIFIC AMERICAN. Orders sent to them will be promptly attended to.

VOL. XII. NO. 1....[NEW SERIES.]....*Twentieth Year.*

NEW YORK, MONDAY, JANUARY 2, 1865.

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WHAT CAN BE DONE FOR INVENTORS.—ADVICE GRATIS AND ADVICE FOR PAY.

For the information of Inventors, we would state that it is the custom, at the office of this paper, to examine models or drawings and descriptions of alleged new inventions, and to give written or verbal advice as to their patentability, without charge. Persons having made what they consider improvements in any branch of machinery, and contemplate securing the same by Letters Patent, are advised to send a sketch or model of it to this office. An examination will be made and an answer returned by early mail. Through our Branch Office, located directly opposite the Patent Office in Washington, we are enabled to make special examinations into the novelty and patentability of inventions. By having the records of the Patent Office to search, and the models and drawings deposited therein to examine, we are enabled to give an inventor most reliable advice as to the probabilities of his obtaining a patent, and also as to the extent of the claim that it is expedient to set up when the papers for an application are prepared. For this special examination at the Patent Office we make a charge of Five Dollars. It is necessary that a model or drawing and a description of the invention should accompany the remittance.

The publishers of this paper have been engaged in procuring patents for the past eighteen years, during which time they have acted as Attorneys for more than TWENTY THOUSAND patentees. Nearly all the patents taken by American citizens in FOREIGN countries are procured through the agency of this office.

Pamphlets of instructions as to the best mode of obtaining patents in this and all foreign countries are furnished free on application.

For further particulars as to what can be done for inventors at this office, see advertisement on another page, or address

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BREECH-LOADERS TO BE ADOPTED.—The Government has appointed a commission of seven military officers, to meet at Springfield Armory on the 4th of January, for the purpose of testing breech-loading carbines and muskets, in order to select the best for army use.

PROFESSOR RANKINE ON EXPANSION.

We have the pleasure of laying before our readers in this number a communication on Expansion, from W. J. Macquorn Rankine, LL.D., of Glasgow University. Among the eminent masters of science, the two who have probably devoted most labor to the study of steam, are Regnault, of France, and Rankine, of Scotland; and there can be no higher authority on all questions relating to this department of physics than Professor Rankine. In this communication, the effects produced on the temperature and tension of steam by its expansion under various conditions are most clearly and distinctly stated.

It will be seen, that Professor Rankine says that steam, in expanding, without doing work, is slightly superheated; thus ratifying our reasoning on this point, and contradicting the conclusions of Mr. Isherwood in regard to condensation from "expansion *per se*."

In going over so much ground in a short newspaper article, of course it was necessary to condense the several statements to the utmost, and while we admire the terseness, we cannot help wishing for a fuller discussion of some of the positions. From some of Mr. Tyndall's remarks we should suppose that he would take the ground that steam in escaping through a safety-valve performs precisely the same amount of work, in disturbing the atmosphere and in other ways, that it does when it pushes a piston before it in a loaded engine. But Professor Rankine says that in the former case it does no work, and is superheated, while in the latter, it performs work, and is partly condensed.

In Mr. Isherwood's experiments, as well as in those of Messrs. Hecker and Waterman, it was found that from 8 to 45 per cent. of the steam was condensed in the cylinder, without doing work. This condensation takes place even when the cylinder is surrounded by a jacket of hot steam, the cooling not being effected by the conduction of heat through the walls of the cylinder, but by the abstraction of heat from the interior surface, in re-evaporating, during the exhaust, the water formed by condensation during the previous stroke. Should the fact of this large condensation be confirmed by other observers, it will be a very important matter to be taken into account in the practical application of Professor Rankine's principles to working engines.

Ought this condensation to be considered, or ought it not, in the third case cited by Professor Rankine, where steam expands and performs work, being maintained exactly at the temperature of saturation? It is said that the circumstances of this case are practically realized in many actual steam engines, as is shown by the agreement of their performance with the results of calculation. Though the performance of the engine agrees with the calculated power of the steam operating in the cylinder, what would be the agreement if the calculation was based on the whole quantity of steam formed in the boiler?

It was from the assumed disturbance of the pressure in the cylinder of a steam engine by this condensation and re-evaporation, that we supposed this instrument fails to furnish data for determining the *theory* of expansion. Though indicator diagrams give a good approximation to the whole *work done*, if from 8 to 45 per cent of the steam is condensed without doing work, the work done is not a very close approximation to that which the whole of the steam would perform if it were all utilized.

The occurrence, however, of this large condensation needs confirmation by other observers before it can be accepted as fully established.

In the mean time, it is exceedingly satisfactory to have the world's present knowledge of steam so briefly and distinctly set forth. Steam in expanding without doing work is superheated, and when Messrs. Joule and Thompson have ascertained the rate of superheating, we shall have a complete theory of expansion, which will supersede the calculations based on the Mariotte law and the hyperbolic curve.

COPPER IN SPAIN.—M. Tribaut, a French mining engineer, has lately discovered a very rich vein of cobaltiferous copper, containing nearly 9 per cent. of oxide of Cobalt, near Oviedo, in Spain. He has entered into an agreement with an English house to take nearly the whole produce of his mines.

RETROSPECTIVE.

There is nothing more illustrative of the national energy and genius than the indomitable spirit exhibited under adverse circumstances. If in any other country than our beloved America a faction should arise and threaten the national existence, the plow would stand idle in the furrow, the threads of the loom swing listlessly from the frames, the anvils clink only to the sharpening of swords. The arts have not languished with us though the war still goes on. No very great inventions have been introduced during the past twelve months, but in that time old ones have been well tried and not found wanting.

The turret system for iron-clad vessels of war, against which so much has been written, has proved itself of paramount importance, and signal victories have been gained over our enemies through its adoption.

The utilization of the products of combustion, as applied to air engines, has been perfected in Roper's machine, and a very useful addition made to the list of prime movers.

In the matter of working heavy guns on shipboard we have great superiority over foreign powers. Two men can now handle a 20-tun gun, or heavier, with as much ease as a field piece in battery is maneuvered, and that though the ship be rolling at any angle. When a gunner can stand on his feet, these huge cannon can be worked. The system is the invention of Capt. John Ericsson, and patents were taken out on it through this office.

In the beautiful art of photography some progress has been made during the past year. The distinguishing improvements relate to the printing process. Mr. Swan, of England, has brought to great perfection the plan of carbon printing, by which the salts of silver are wholly discarded. Pictures superior in artistic effect to the silver prints, more permanent, cheaper, and capable of greater variety of tint and tone, are thus produced. Another improvement which has attracted much attention is that of Wothly, of Germany. He prepares the paper for printing by pouring upon its surface a collodion which contains a few grains of the salts of uranium, and also of silver. Very beautiful pictures are made on this paper, and some of the inconveniences of the ordinary method of silver printing are overcome. Both of the above improvements have been fully set forth in our columns.

The extension of the electric telegraph over Russian America, binding it to this country, although not an invention, is one of those great enterprizes which will open up new countries to the influence of civilization, and tend to dissipate ignorance, the twin brother of barbarism.

New textile fabrics are being experimented with; new substances for paper making are being tried, but come into use slowly, although manifestly economical and valuable.

In the art of war, very much has been done, and is doing, to render our nation superior to all others. Cannon of large caliber have been introduced, and are making way, in spite of the obstacles thrown in their path by learned and unlearned. Submarine warfare, as relates to the use of torpedoes, has also been experimented with, and the gallant achievement of Lieut. Cushing, with Chief Engineer Wood's apparatus, is an evidence that practical results can be obtained.

The adoption of breech-loading small arms to a considerable extent is also a desirable conclusion arrived at, and the experiments with wrought-iron cannon now in progress will doubtless end in the adoption of them for certain purposes. In hooped ordnance we have the Parrott gun, of which the Chief of Ordnance says that it has proved itself to be a most excellent weapon, superior in general to all others.

The development of petroleum has attracted the greatest attention during the past twelve months, and has become an established industry. The geographical extent of the country in which petroleum is found is known positively to be of immense area. Much value will always attach to it as a staple article.

Of minor inventions the number and character are too great for special mention. The list of patent claims, published weekly in this journal, affords convincing proof that inventors are not idle. There are many things which will never become celebrated in the world that now employ hundreds of tuns of iron

and thousands of dollars of capital in their production.

OIL STOCK EXCITEMENT.

Nothing in the history of this country, if we except the furor that followed the opening of the gold fields of California, has caused so much excitement in business circles as the rapid development of the petroleum oil interests. There are oil stock exchanges, oil stock journals, and all the other appliances of regular commercial and financial operations. Oil cities even have sprung into existence, and speculation is running up to fever heat; hundreds of Joint Stock Companies have been organized, and a still larger number are now rapidly organizing. Thousands of persons are being allured to invest their money in the stocks of these companies under the stimulus of promises of large dividends.

Now, although there is much substantial merit in the oil well productions of the country, and it is true that there are many really substantial Companies, it behooves those who are infected with the oil fever, to be extremely cautious how they invest their money, or they will surely suffer loss.

Most of the Companies now organized have a nominal capital stock far exceeding the actual investment. Purchasers are attracted towards them by the magnetic newspaper puff, and by rose colored prospectuses they are led to expect results which, in many cases, can never be realized. To illustrate how these Joint Stock Companies are sprung upon the credulous public, we will give an example. A few individuals get control of a patch of land located somewhere in the oil region—land secured under excitement and at speculative prices. The amount promised to be paid for the property we will assume to be $100,000, a portion of which will be taken by the original owner in stock; with a reserved working capital of $25,000 additional. Upon this basis a stock scheme of $500,000 is predicated, and all the enginery well known to the getters up of Stock Companies—for it is a profession now-a-days—is set in full tide of operation. Large commissions are paid to friends to forward the scheme by stirring about among their acquaintances and inducing them to subscribe. These *disinterested* "friends" are "let in," as the phrase is, on "bottom prices;" in other words, they get their shares of stock at cost prices, besides receiving generous commissions for roping in outsiders who pay for their stock two and three times its actual cost in the original investment. Such stocks are known in the market as "watered stocks," and the name as applied to oil stock—more water than oil, which is sometimes a peculiar phenomenon of the oil well—is quite apropos. In reference to the productive value of a particular tract it must be, in many cases, purely hypothetical. Calculations are often based on an assumed fact; sometimes simply on the ground that hard by is a "hundred barrel well" owned and worked by some other company; but cash dividends on the stock will be declared and duly paid—and thus the outsider will be at once assured that he has indeed "struck ile." Matters will proceed in this way for a few months, perhaps, during which time, under this artificial stimulus, the originators of the scheme will find ample opportunity to sell out to eager outsiders. Dividends will then cease, and all these oil stock martyrs will have to show for their investment will be a nicely engraved stock certificate, a few acres of undeveloped land, and a return of perhaps twenty-five per cent, or less, of the original investment in the watered stock. Even these poor profits from the speculation, the certificates excepted, may not be secure in possession; liabilities for the debts of the company may materially lessen them.

According to a carefully prepared table now before us there are more than three hundred and fifty organized companies now in existence, with published capitals, ranging from $50,000 to $10,000,000, and one company, proposing to consolidate several others with it, a capital of $15,000,000.

It is impossible for any sound minded man to ignore the fact that thousands, if not millions of dollars will be abstracted from the people's pockets, and wasted upon a set of men, who, under the guise of respectability, are nothing more nor less than a set of genteel swindlers. As a general rule, we should think it would be safer to look for good investments in any oil stocks rather than in those brought to our notice in the long winded advertisements which appear in the newspapers. Companies which can be relied upon are not obliged to resort to newspaper puffs for their success; and we advise those of our readers who have an itching for oil stock investments to look sharply into the matter before purchasing largely.

The stock speculative fever is now raging throughout the whole community to an alarming degree—and when the reaction comes on, many an unfortunate dupe will suffer a most prostrating debility.

PROF. DOREMUS'S LECTURES.

DELICATE TEST FOR ARSENIC.

The compounds of hydrogen formed the subject of the third lecture of Prof. Doremus's course on pneumatic chemistry. Among the most interesting experiments exhibited was the decomposition of arseniuretted hydrogen by heat. Some hydrogen was produced in a retort in the usual manner by the decomposition of water, and was passed through a U tube containing lime to free it from any carbonic acid that it might contain, and then through a second U tube filled with bits of chloride of calcium to absorb the vapor of water mingled with it, in order to procure the gas perfectly pure and dry. It then entered a small glass tube, the middle portion of which was curved into a flat coil, which was heated red hot. No stain appeared on the tube. But on pouring a solution of arsenic into the retort so as to produce arseniuretted hydrogen, a metallic deposit immediately made its appearance beyond the coil, showing that the gas was decomposed by the heat, when the hydrogen was set free, and the arsenic was deposited in the metallic form. The lecturer stated that if oxygen gas was blown backwards into the tube the arsenic would be oxydized, and the crystals of white oxide of arsenic would be found in the tube on the opposite side of the coil.

A NEAT MODE OF MAKING ORPIMENT.

Prof. Doremus explained that chlorine has so strong an affinity for hydrogen that it will take that element from many of its compounds. To illustrate this he introduced a little arseniuretted hydrogen gas under the mouth of a tall inverted bell glass filled with water, when the gas, of course, rose to the top, displacing its own volume of the water. Some sulphuretted hydrogen gas was then poured in the same way up the same glass. On adding some chlorine gas to the mixture, the chlorine took the hydrogen from both the arsenic and the sulphur, when those two elements entered into combination as the sesquisulphuret of arsenic, or yellow orpiment. The hydrogen and chlorine combined to form hydrochloric acid gas, which was absorbed by the water.

FREEZING OF MERCURY IN A RED HOT CUP.

The experiments of the fourth and fifth lectures were mostly repetitions of those made by the same lecturer last winter, and fully described at the time in the Scientific American. One of the most impressive of these was the freezing of a thimble full of mercury in a red hot platinum cup, by means of solidified carbonic acid and ether.

VOTE OF THANKS TO THE LECTURER.

At the close of the last lecture of the course, a vote of thanks was unanimously and most heartily given by the audience to Prof. Doremus, for his exceedingly interesting lectures and brilliant experiments.

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.

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ISSUED FROM THE UNITED STATES PATENT-OFFICE

FOR THE WEEK ENDING DECEMBER 20, 1864.

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.

45,465.—Machine for Making Match-splints.—Emory Andrews & William Tucker, Springfield, Mass.:

We claim, first, The combination of the series of hoppers, the sectional knife cylinder, E, and the guides, f, on the table, B, arranged, constructed, and operating substantially as described.

Second, The rack, G, to which an intermittent rectilinear motion is imparted by suitable mechanism in combination with the guides, f, knives, e, feed-plate, D, and hoppers, C, constructed and operating substantially as and for the purpose set forth.

Third, The combination of the elastic bands with the stationary lower slat and the upper movable slat in the vertically moving rack by which the match sticks are received and held, at the intervals between the sections or tiers, as they pass from the table under the pressure of the succeeding set.

Fourth, The arrangement substantially as described, consisting of the stationary and movable combs and their operating mechanism by which the alternate match splints within the embrace of the clamp, g, are slipped out so as to detach their points for dipping.

Fifth, We claim arranging the match-splints in the clamps in the manner described, as effected by the combs, r r', so that they may project alternately at each side of the clamp for dipping and so that the tiers of matches being removed from the frame, may be laid upon each other chequer-board fashion, with the blank ends separating the charged ends, preventing the friction of the composition on adjoining matches.

45,466.—Magazine or Self-loading Fire-arm.—John F. Appleby, Mazomaine, Wis.:

I claim the combination of the cartridge ratchet-rod, G, with the breech-piece, C, substantially in the manner and for the purpose herein shown and described.

I also claim the combination of the spring cartridge lifter, I, with the breech-piece, C, and ratchet-rod, G, substantially in the manner and for the purpose herein shown and described.

[This invention pertains to that variety of breech-loading fire-arms known as "magazine guns," in which a considerable number of cartridges are carried in the stock, and are so connected with and operated upon by the mechanism of the arm that the cartridges are successively seized and deposited within the barrel, ready for firing. An engraving and description of it appeared on page 49, Vol. XI., Scientific American.]

45,467.—Pump.—John Bean, Hudson, Mich.:

I claim the combination of the plungers, M and L, with the center valve, g, and the two valves, n, the whole constructed and operated substantially as and for the purpose herein described.

45,468.—Ore Amalgamator.—John M. Beath, San Francisco, Cal.:

I claim, first, A cylinder so constructed as to take the pulp in at its ends, and discharge it through openings in its periphery, using for that purpose the cylinder above described, or any other that is substantially the same and will have the intended effect.

Second, I claim the described method of arranging the dies on the periphery of the cylinder so as to produce a free circulation of pulp in the tank around the dies and cylinder.

Third, I claim the described method of hanging the dies so that the wear and pressure increases from the front to the back part, the whole being for the purposes set forth.

45,469.—Cartridge Box.—Erastus Blakeslee, Plymouth, Conn.:

I claim the combination of one or more movable metal tubes, each containing two or more cartridges with a spring top cartridge box and side pouch, as herein described and for the purposes set forth.

45,470.—Evaporating Apparatus.—Stephed Bowerman, Battle Creek, Mich.:

I claim, first, The arrangement of the evaporating pans, E, and central zig-zag flue, C, within a closed furnace, A, in such manner that the top and bottom surfaces of said pans will be subjected to the heat radiated from said flue, substantially as described.

Second, A flue, C, which is conducted in its upward course through the furnace in such manner as to form an upper and a lower heating surface for each one of a series of removable pans, arranged substantially as described.

Third, Supporting the flue, C, and also the pans, E, when they are arranged substantially as described upon the frames, F, and rods, a a, substantially as set forth.

Fourth, The application of over-flow pipes, g, to removable or stationary evaporating pans, which are arranged one above the other within a closed furnace, substantially as described.

45,471.—Grain Dryer.—Jonathan S. Buell & Samuel A. W. Marsh, Buffalo, N. Y.:

We claim, first, The combination with a grain-dryer and with a furnace for steam boilers or other fireplace of a reheating furnace and a fan-blower, when the latter is so arranged in a pipe or pipes leading from the primary fireplace into the grain-dryer, substantially as and for the purpose set forth.

Second, The combination and arrangement of the damper, J, and the pipes, D C and I, with the furnace, A, and the rotary fan, R, substantially as and for the purpose set forth.

Third, The combination of the pipe, Q, or its equivalent, with graduated openings with the rotary fan, R, for blowing either a hot or cold blast, substantially as and for the purpose set forth.

Fourth, The combination of the damper, V, with the pipe, C, for the purpose of regulating the draft of the boiler furnace, substantially as and for the purpose set forth.

45,472.—Horse Hay Fork.—Jason R. Cadwell, Dexter, Mich.:

I claim, first, The combination of the hinged toothed handle, C, locking-plate, B, and forked head, A, in such manner that the fork can be used either for elevating hay or as a common dung fork, at pleasure, substantially as described.

Second, Pivoting the handle of a hay-fork to a catch-plate, B, which is affixed to the fork-head, and applying a catch to said handle for fixing it at any desired angle to the tines of the fork, substantially as described.

45,473.—Stern-bearing for Propeller Shafts.—R. E. Campbell, New York City:

I claim the combination of the box, C, wedge, D, and one or more keys, E F, arranged and operating as described.

[This invention consists in the application of a wedge acted upon by a key in combination with the lower box of a stern-bearing, in such a manner that by the action of the key and wedge said box can be readily adjusted as it wears, and when it has completely worn out it can be easily removed and replaced by a new one, without disturbing the bracket.]

45,474.—Case Shot.—John F. Clew, New York City :
I claim the arrangement of elongated projectiles in a grape or case shot in one or more series with surrounding and interposed disks, substantially as herein specified.

[This invention relates to the use of elongated projectiles in case or grape-shot, and consists in a novel arrangement of, and a new mode of holding together, such projectiles within a case or without one, whereby they are caused to be projected with their points forward and to strike point on.]

45,475.—Submarine Port-hole.—John F. Clew, New York City :
I claim, first, An elastic embrasure constructed substantially as shown, for the purpose of forming a water-tight joint with the muzzel, and sides of ordnance, substantially as above described.
Second, I also claim the ring, J, constructed and operated substantially as above described for tightening the joints of the port-shutter.
Third, I also claim the pipe, s, when applied as shown to the seat of the shutter, A, for the purpose of freeing it of water.
Fourth, I also claim the combination of a sliding shutter with an embrasure whose sides are elastic, substantially as above described, for the purpose of firing ordnance under water.
Fifth, I further claim an elastic embrasure with double conical sides as shown in combination with a tapering muzzle or tapering sides of the ordnance to be used therewith, substantially as above described.

[This invention has for its object to construct a sub-marine port-hole or embrasure. In carrying out his invention, the inventor has provided the usual facilities for the discharge of ordnance, and has also provided suitable means and devices to prevent the water from rushing through the embrasure while in action.]

45,476.—Shaft Coupling.—James P. Collins, Troy, N. Y.:
I claim a divided collar provided with one or more screw threads, and two conical surfaces in its exterior, in connection with nuts and female cones; all arranged to form a new and improved coupling for shafting, substantially as set forth.

45,477.—Basting Gage for Sewing Machines.—Lander T. Conant, New Lisbon, Ohio :
I claim, first, The base-plate, B, with its guide-pins, T T T, diagonal ridges, I I I, deflected edges and slot, S, the whole constructed as described and combined with the upper and middle plates, as and for the purpose set forth.
Second, I claim the vertically movable upper plate, O, with its deflected edges, its sockets, J J J, as seen in Fig. 4, for fitting on the studs or guide-pins, T T T, as seen in Fig. 1, with its diagonal ridges, I I I, as seen in Fig. 4, for the purpose of automatically inclining the cloth against the guide-pins in its passage, to the needles of the machine, substantially as described and for the purposes herein set forth.
Third, I claim the smooth vertically movable middle plate, D, as seen in Fig. 3, with its sockets, J J J, for fitting on the studs or guide pins, T T T, as seen in Fig. 1, substantially as described and for the purposes hereinbefore set forth.
Fourth, I claim the spring, M, or its equivalent, so fastened that its bearing rests on or over the middle ridge, as seen in Fig. 1, for the holding of plates, D and O, in their places and giving a gentle and even pressure from guide-pins to point on all materials passing through the basting gage, substantially as described and for the purposes herein set forth.

45,478.—Stove.—David B. Cox, Troy, N. Y.:
I claim in a horizontally corrugated fire-pot, or plate or plates, forming part or the whole of a first pot, the apertures, C C C, when placed in that part of the corrugation inclining from the center or fire to the outside, at such point as will leave the extreme inner projections of corrugation projecting over said apertures, forming a cover or guard for them for the purposes described.
I claim in combination with said corrugations and apertures, the air chamber, B B B B, for the purposes described.

45,479.—Field Hospital Cot and Stretcher.—Wm. Dann, Cincinnati, Ohio :
I claim the combination of the poles, A A, posts, C, bar, E, with the sockets or braces, B D, the latter being constructed in the manner herein described and employed to admit of the parts being readily put together or taken apart, as explained.

[The object of this invention is to adapt a cot to the requirements of a field hospital. The cot may be readily put together, taken apart and packed for transportation; may be set up with the patient raised from the ground, as an independent bed. It consists of but few pieces which are not of a character to be lost or mislaid, and is fastened together in such a manner that it is possible for an ordinary mechanic to replace a missing piece.]

45,480.—Manufacture of Paper Pulp from Wood.—John W. Dixon, Philadelphia, Pa.;
I claim, first, The manufacture of pulp from wood by treating the wood with a solution of caustic soda at 18° Baume, or higher, and at near or about 212° Fah., and below 290° Fah.
Second, The succession reuse of the waste liquor from the first wood pulping process in a second or third wood pulping process by the addition of reduced percentages of fresh caustic soda, substantially as above described.

45,481.—Horse-rake.—Thomas H. Dodge, Worcester, Mass.:
I claim the employment in connection with the rake-head eccentrically as described of the gears, H I, shaft, b, and hand-lever, K, all arranged substantially as and for the purposes described.
I also claim the combination with the rake-head, hinged as described, of the ping, g, and spring-catch lever, M, substantially in the manner and for the purposes set forth.
I also claim the arrangement in combination with the rake-head, G, gears, H I, and shaft, d, provided with hand and foot levers, K d e, of the elevating and lowering rope, L, substantially as and for the purposes described.

45,482.—Machine for Counting.—John Dolbeer, San Francisco, Cal.:
I claim arranging the three indexes, C C' C'' to move around a common center substantially as described, in combination with the counting arm, B, pawl, S, and dial plate, A, for the purposes set forth.

45,483.—Tool for Boring Holes.—Augustus Eliaers, Boston, Mass.:
I claim a lever cutter attached to or working within a screw-shaft, and so operated upon by a nut and spring or their equivalents, that the length of its radius from the center of said screw-shaft can be increased or diminished at pleasure while being revolved, for the purpose of forming undercuts, substantially as described.

45,484.—Chain-pump.—L. A. Fisher, Chicago, Ill.:
I claim the combination of the movable buckets with the mechanism for changing the position of the same, substantially as set forth.

45,485.—Car-replacer.—George Fowler, Macon, Ill.:
I claim the clamps, C C' in combination with the rails, B' B'', and bar, D, all constructed and arranged substantially as and for the purpose herein set forth.

[The object of this invention is to obtain a device of simple construction which may be readily applied to the rails of a railroad track in order to place a car thereon.]

45,486.—Cow-milker.—G. H. Gardner, Philadelphia, Pa.:
I claim, first, Stop-cocks so combined with a cow-milker, so constructed and so arranged in respect to the teat cups of the same, that the operation of the instrument on one or more of the teats may be discontinued while it is continued on the remaining teats.
Second, The three way cocks, E, with their branches, e and e', and the several openings herein described, in combination with the four branches, D D' D'' and D''', for the purposes described.

45,487.—Spring Bed Bottom.—James E. Gillespie, Trenton, N. J.:
I claim the combination of the spring, B, and link, F, with the slat, D, and the rail, A, the whole being constructed and arranged to operate substantially as specified.

45,488.—Veneer-cutting Machine.—J. R. Graham, New York City :
I claim the stay-plate, F, when made adjustable as specified, and for the purpose set forth, in combination with the cutting knife, substantially as described.

45,489.—Preparation of Fine-cut Tobacco.—Peter N. Greer, New York City :
I claim a plug tobacco formed from the shorts, prepared and put up as herein above described, by pressing, substantially as described and for the purpose set forth.

45,490.—Portable Picket Fence.—George Gross, Buffalo, N. Y.:
I claim the arrangement and combination of the devices for locking, adjusting, bracing and supporting the portable picket fence, as herein described.

45,491.—Gas and Water Pipe.—Wm. B. Guy, Boston, Mass., assignor to E. H. Austen, Madbury, N. H.:
I claim, first, The inner tube of glass separated from the pipe, in the manner and for the purpose set forth.
Second, Any elastic or plastic substance placed between the pipe and inner tube or lining, substantially as and for the purpose described.

45,492.—Saddle Tree.—Emery E. Hardy, New York City :
I claim, first, The turret plate of a saddle tree, constructed and arranged as described
Second, In combination with the turret plate and saddle tree, the socket, N, the crupper loop, F, and pin, K, attached to the seat as described and set forth.
Third, Lining a metal saddle seat with wood or leather, so that the covering of the seat or a welt may be tacked to it.

45,493.—Lamp Burner.—John O. Harris, Reading, Pa.:
I claim the employment or use in a connection with a lamp burner of two jackets, E E', placed one within the other, and provided with one or more horizontal slots, e, extending through both jackets, and either with or without the end draught passages, d d, substantially as and for the purpose herein set forth.

[This invention relates to an improvement in that class of lamp burners which are designed for burning coal-oil and similar hydrocarbons which require a large amount of oxygen to support combustion and produce a good illuminating flame.]

45,494.—Tubular Boiler.—Charles Hawthorn, Pittsburgh, Pa. :
I claim making the holes in the heads of tubular boilers, for the insertion of the flues, with a gutter in the wall or sides of the flue hole and forcing the sides of that part of the flue, which passes through the hole, down into the gutter, so as to make the flue conform to the shape of the hole, substantially as for the purposes hereinbefore described.

45,495.—Breech-loading Fire-arm.—Hiram W. Hayden, Waterbury, Conn. :
I claim, first, A breech block, having a chamber passing entirely through it, and fitted upon trunnions in combination with the pendent jaws, k, and lever, h, substantially as specified, whereby the said lever first slides the breech block back and then partially rotates it, and the reverse in closing the breech, as set forth.
Second, I claim the shear, 7, in combination with the swinging breech block, e, having the chamber, f, passing entirely through said block, and the projections, 9, taking the ribs, 8, for keeping the rear portion of the breech block to the shear, as set forth.
Third, I claim a sliding breech pin, l, in combination with a chambered breech swinging on trunnions and acting to close the rear end of the chamber in said breech when on line with the barrel, as set forth.
Fourth, I claim the wedge, m, and forks, o o, in combination with the sliding breech pins, l, and swinging breech, e, having a chamber passing through it, whereby the breech pin, l, is secured at the rear end of the chamber in the swing breech, as set forth.
Fifth, I claim the screw, r, and spring in the slot of the breech pin, for the purpose and as specified.
Sixth, I claim the combination of the lever, h, breech, e, breech-pin, l, and wedge, m, whereby said lever effects the movement of all the parts in harmony with each other, as specified.

45,496.—Pipe Tongs.—Henry Herbert, Cincinnati, Ohio:
I claim as a new article of manufacture the adjustable pipe tongs, hereinbefore described, provided with the slot, J, pivot, I, nut, M, corrugated washer, K k, corrugations, b'', and dovetail sockets, a b b', all as specified.

45,497.—Clock Dial Sash.—George Hills, 'Plainville, Conn. :
I claim the combination of the ring or rim, e, dogs, h, with the sash glass, and dial, c d a, substantially as and for the purpose described.

45,498.—Inkstand.—Philip K. Holbrook, Malden, Mass.:
I claim the reservoir, B, with its flexible tube, C, and dipping cup, D, arranged in the stand or base, A, and operating substantially as set forth.

45,499.—Shifting Blind.—Byron C. Howell, Ithaca, N. Y., and A. B. Thompson and E. D. Snyder, Oswego, N. Y.:
We claim, first, Constructing and arranging a blind that it may be lifted or reversed, and worn first one side out and then the other without removing the hinges thereof.
Second, The constructing and arranging the blind, hinges and rod in the manner herein described and for the purposes specified.

45,500.—Lamp-chimney Cleaner.—Ferdinand Imhorst, New York City :
I claim a lamp chimney cleaner with two pans, A B, applied to the ends of two levers, A' B', of unequal lengths, and hinged together substantially in the manner herein shown and described.

[This invention consists in the application of two pads attached to the ends of two levers which are of unequal length, and connected together in the manner of shears, in such a way that when those ends of said levers which carry the pads are closed, they can readily be introduced into a lamp chimney and by pressing on the rear ends of the levers the pads are pressed against the inner surface of the chimney, and by turning the levers in the chimney, or both in opposite directions, the pad at the end of the long lever cleans the top, and the pad at the end of the short lever the bulb of the chimney in an easy and perfect manner.]

45,501.—Knitting Machine.—G. Gensen, of Brooklyn, N. Y. :
First, I claim the screw-formed gear, n, and gears, m and r, in combination with the shafts, k and q, for rotating the bobbin gears, and wheels inside and outside the stationary cylinder of needles, as specified.
Second, I claim the changeable ring of needles, fitted substantially as specified, in combination with the adjustable standards, e f' and d', of the gear, e', wheel, f, and bobbin, d, as specified.
Third, I claim the take-up wheels, v v', in combination with the belt, 13, and wheels or pulleys, y z and z', arranged and acting substantially as specified.

45,502.—Horse Rake.—George Kimball, Springfield, Vt.:
I claim the two lever frames, I' I', attached to the rake head, G, as shown, in combination with the lever, J, attached to the axle, A, and connected to the frame, I', by the rod, K, when said parts are used with a rake attached to the thills, C C, in front of the wheels, B B, and all arranged to operate substantially as and for the purpose set forth.

[This invention consists in having the rake attached to the thills in front of the wheels, and having hand and foot levers arranged and applied in such a manner that the driver, while on his seat, and when the rake is at work, will have perfect control over the latter so as to keep it in proper working position, and allow it to yield or give to conform to the inequalities of surface over which it may pass, and also readily raise it in order that it may discharge its load.]

45,503.—Corn Cultivator.—A. Kinyon.—Amboy Ill. :
I claim, first, The tubular shaft, G, having the plow beam, I I, attached to it by straps, T, in connection with the rod, R, fitted loosely in said shaft and connected by pendants, H, with the beams, H, and connected by a strap or cord, q, with a pulley, V, all arranged substantially as shown, to admit of the adjustment of the plows, as set forth.
Second, The attaching of the front ends of the plow beams, I I, to the parts, b b, of the draught pole through the medium of the swinging bent bars, O O, connected by a draught equalizer composed of the rods, Q Q, chains, j j, rod, l, and pulley or pins, k, all arranged substantially as and for the purpose set forth.
Third, The securing of the standards, J, to the beams, I, by means of the eyes, d screw rods, e, and nuts, f, to admit of the adjusting of the plows, I, as set forth
Fourth, Constructing the draught pole of two parts, b b, arranged in V form and attached to the axle, A, as shown, when said pole, thus constructed, is used in connection with the plow beams, I I, arranged with the mechanism described for adjusting them vertically or laterally, as specified.

[This invention relates to a new and improved corn cultivator, of that class in which laterally-moving plows are employed for adjusting the same to the rows of plants, so that they may conform to their sinuosities.]

45,504.—Combined Caster and Cooler for Soda Fountains.—Thomas Larter, Cleveland, Ohio :
I claim, first, The separate glass cruets, H, provided with the tube, h, and faucet, h', when arranged and operating in the manner and for the purpose set forth.
Second, I claim the ice chamber, B, in combination with the chamber, D, and cruets, H, when the whole are arranged as herein set forth

45,505.—Washstand, Bureau, Desk and Wardrobe.—Anson Lee, New York City :
I claim a combined washstand, bureau, writing desk and wardrobe, constructed as herein set forth, as a new article of manufacture.

[The object of this invention is to combine a washstand, a bureau, a writing desk, and a wardrobe all in one piece of furniture, thereby producing an article of the greatest convenience, particularly for people living in cities where a saving of space is a great desideratum.]

45,506.—Uterine Supporter.—James Lee, Stevens' Point, Wis.:
First, I claim producing an enlargement of the stem, A, in the manner and for the purpose above set forth.
Second, In combination with the flexible stem, A, I claim the rigid stem, C, when arranged and operating as described.
Third, I claim the combination of the pessary, D, with the supporting stem, A, as herein described.

45,507.—Metallic Head for Barrels.—Sylvester Lewis, Rochester, N. Y.:
I claim the application to a metallic barrel or cask head of two or more beveled projections upon the outer rim thereof, as above described, and the application of gum shellac or other similar substance to the same, as herein set forth. Also the circular elevation around and adjoining said space, A A, for the protection of the staves as aforesaid.

45,508.—Damper for Flues.—John Liming, Philadelphia, Pa.:
I claim the application to a stovepipe or other external escape flue of a heater, of an opening, B, adjustable by means of a damper constructed so as to operate substantially in the manner described and set forth for the purpose specified.

45,509.—Car Coupling.—B. F. Marsden, Galena, Ill. Ante-dated Dec. 9, 1864 :
I claim the two openings, a a', in the draw heads, A A, in combination with the two links, B B, and the removable or rising and falling jointed pins, C C, all arranged substantially as and for the purpose herein set forth.

45,510.—Process for Preparing sawdust for Paper Pulp.—Harrison B. Meech, Fort Edward, N. Y.:
I claim the peculiar process by me above described for treating sawdust preparatory to converting it into a suitable material for the manufacture of paper, substantially in the manner and for the purposes above described.

40,511.—Artificial Limbs.—Anton Mermel, New York City :
I claim the construction of artificial limbs by means of the strips a b and c, in combination, cemented compactly together, the shells d e and f, forming one shell, substantially as above described.

45,512.—Tool for closing or contracting the Barrels of Watches.—Chas. S. Mosely, Waltham, Mass.:
I claim the above described tool, consisting essentially of the anvil, B, and the conical die, C, suitably guided in a frame or stock, and operating substantially as described for the purpose specified.

45,513.—Night Burner.—Walter P. Newhall, Peekskill, N. Y. assignor to Geo. P. Ganster, New York City:
I claim the device, C, applied to common coal-oil burners, constructed of the cap, e, plate, d, and rod, f, and for the purpose of being operated from the outside of the chimney holder, as herein shown and described.

45,514.—Belt Tightening,—John Nichols, Fond du Lac, Wis. :
I claim, first, The combination of the rod or shaft, N, guided by the cross bar, Q, with the screw, M, and pulley shaft, B, when constructed and arranged substantially as set forth.
Second, I also claim the movable box, P, in combination with the screw, Y, for leveling the shaft, B, substantially in the manner described.

45,515.—Grain Elevator.—John Nichols, Fond du Lac, Wis. :
I claim, first, The arrangement and combination of the index wheel, H, with the revolving spout, E, operated by pulleys and hand, substantially in the manner and for the purposes set forth.
Second, I claim the use of the circular table, L, attached to the elevator pipe, A, substantially as described.
Third, I also claim the combination of the table, L, with the elevator frame and the revolving spout, substantially as specified.
Fourth, I claim the use of the pulleys, I, in combination with the vertical pulley, H, and horizontal pulley, F, and band, G, substantially as specified.

45,516.—Saw-mill.—John C. and J. L. Nutt, Jefferson, Ohio :
We claim, first, The adjustable block, a, screw, f, or its equivalent, in combination with the parallel rods, d d', and tension rod, b, as and for the purpose set forth.
Second, We claim the arrangement of the sectional circles, c c, in combination with the vibrating sash frame, B, operating conjointly as and for the purpose described.
Third, We claim the arrangement of the sliding frame, n, spring, g, in combination with the arms, i j, pulley, p, and vibrating frame, operating as and for the purpose described.

45,517.—Grain Separator.—E. C. Patterson, Chicago, Ill. :
I claim the combination and arrangement of the series, C D E, the channels, F F' F'', and the screens, c d, substantially as and for the purposes herein delineated and set forth.

45,518.—Composition for Crayons.—Isaac N. Peirce, Boston, Mass. :
I claim the combination of the kaolin with the several ingredients specified, substantially in the proportions and for the purpose set forth.

45,519.—Coupling for Carriage Shafts,—Timothy Pendergast, New Haven, Conn. :
I claim a key constructed as described in combination with an eccentrically-formed connection, E, and coupling, c, when arranged to operate in the manner and for the purposes specified.

45,520.—Wheel Plow.—Jabish Pierce, Wyanet, Ill. :
I claim the rod, O, links, T and R, in combination with beams, L, link, N, hounds, B, standard, H, lever, e, when constructed and arranged as herein described.

45,521.—Clothes-drying Machine.—William Price, Cincinnati, Ohio :
I claim, first, The construction and arrangement of a cylindrical apparatus, the same having a series of ventilators with sliding cov-

ers to admit and regulate the circulation of dry or heated air for the purpose of drying clothes, as herein described.

Second, I claim a series of radiating frames, they being constructed with double yielding rods or bars, so as to admit the clothes being easily attached to them, for the purposes herein set forth.

Third, I claim a rotary clothes frame in combination with a fan blower, so that a current of dry or heated air is distributed through and among the clothes, substantially as and for the purposes herein specified.

45,522.—Governor.—J. T. Rich, Rahway, N. J. Ante-dated Dec. 14, 1864 :

I claim the combination of the screw, D, spindle, C, and spring, G, all arranged and operating as and for the purposes specified.

45,523.—Catamenial Bandage.—D. F. Robertson, Middletown, Conn.:

I claim the elastic tape around the border of the sack for controlling the adaptation and fit of the sack, as herein set forth.

45,524.—Screw Gripe.—D. M. Robertson, Manchester, N. H. Ante-dated Dec. 9, 1864 :

I claim the levers, G G, in combination with the jaws, E, and traversing collar, I, for the purpose of griping the article placed in the jaws.

I claim providing the levers, G G, with an adjustable fulcra, for the purposes specified.

45,525.—Rail for Street Railways.—T. M. Schleier, Nashville, Tenn. :

I claim the constructing of rails for railroads with oblique angular notches, presented in opposite directions, substantially as and for the purpose herein set forth.

45,526.—Caloric Engine.—Theodore Schwartz, of New York City. Ante-dated Dec. 7, 1864 :

I claim, first, The combination of devices hereinabove described for maintaining constant temperature in compression and expansion.

Second, The use of an exhaust pump for developing partial vacuum action through combination of rarification by piston with condensation by cooling as stated.

Third, A generator containing liquid for transmitting heat through external action to the working cylinder, substantially as described.

Fourth, Applying the waste heat of the escaping fire currant upon a portion of the cold compressed air to be heated, as described.

Fifth, Feeding the fire with hot air heated through auxiliary regenerator, substantially as described.

Sixth, The use of an exhaustible receptacle, as stated, in working the same air over and over again.

Seventh, The use of the tubes inclosing liquid for regeneration of heat, as shown and described.

Eighth, The bottle-shaped heaters with or without the loose tube inside, as applied under the bottom of the generator.

45,527.—Tunnel.—Samuel J. Seely, New York City :

I claim a wall of concrete inclosed between iron plates with flanged edges, the flanges upon the outer plates serving as ties to prevent their sides from spreading apart by their connection with the other, and the inner serving as stays to the flanges of the other part and to confine the concrete in its place, substantially as described.

45,528.—Sewing Machine.—Dewitt C. Smith, Cincinnati, Ohio :

I claim the combination of the eccentric, F, and its collar, a, and and lugs, b c, with the mechanism, substantially as described, for connecting them with the several moving parts of a sewing machine, for the purpose of operating and timing the motions of the needles, shuttle and feed, as herein described and represented.

45,529.—Calipers.—R. D. O. Smith, Washington, D. C.:

I claim, first, Calipers having only one pair of legs and provided with two scales, so that the same pair of legs may be used for either inside or outside measurements, and the diameters measured be determined by said scales without the aid of rule detached scale, substantially as described.

Second, A double scale for caliper with a single pair of legs, when one half of such scale is upon one blade and the other half of each scale is upon the other blade of the calipers, substantially as described.

45,530.—Wind Wheel.—Robert L. Smith, Stockport, N. Y. :

I claim, first, The combination of a wind wheel and power-retaining mechanism provided with a weight, and all arranged substantially as herein shown and described, so that the wind wheel, when unemployed, will raise the weight and accumulate power which may be employed during the absence of wind, or when the wind wheel is inoperative.

Second, The arranging of the gearing a^s a^s b^s b^s p' o', drum, O, and the ratchets, R n^s, with the pawls, r' r' and J, for the purpose of operating the weight or power-retaining mechanism from the wind wheel, as set forth.

Third, The lever, R, in connection with the notched bar, S, arranged in connection with the weight, Q, and cord, S', for automatically cutting off the connection between the wind wheel and the weight mechanism, as set forth.

Fourth, The wind wheel governor composed of the racks, h h, springs, j, and balls, i i, and connected with the wings or sails, a, through the medium of the gearing, g f, and segments, e, all arranged substantially as herein shown and described.

45,531.—Frame for Harvesting and Seeding Machines.—J. H. Snyder, Killbuck, Ill. :

I claim, first, Hinging or jointing the frame, A and A^1, together at a, as and for the purpose set forth.

Second, I claim the quadrant levers, H^1 H^1, casters, H H, and cords, g' g', in combination with the adjustable frame, A, as and for the purpose set forth.

Third, I claim the combination of the compound levers, d c, rod, d^1, and lever d^{11}, when arranged as and for the purpose set forth.

Fourth, I claim hinging or connecting the shaft, c, to the shaft, B^1, so that the bearing, C^{11}, and the connection of the brace, c^{11}, to the shaft, B^1, will allow the shaft, c, to rotate in its bearings, and at the same time be self-adjustable to any desired position of the frames, as and for the purpose set forth.

Fifth, I claim the caster wheel, F, rudder wheel, F^1, spring guide, f^1, and windlass, G, in combination with the adjustable jointed frames, A^1 A, when arranged as and for the purpose set forth.

Sixth, I claim the fastenings, J J^1, and arms, A^{11} A^{11}, in combination with the adjustable frame, A^1, as and for the purpose set forth.

45,532.—Safety-device for Locks of Fire-arms.—E. T. Starr, New York City :

I claim the combination with the hammer, D, of a lever lock, E, when the said lock is so made and arranged as to be operated by the act of raising or letting down the hammer, substantially as herein shown and described.

[The object of this invention is to prevent the hammer of the fire arm from being accidentally driven or forced against the cartridge or cap, and thus to avoid the danger of those premature explosions by which life and limb are so often sacrificed.]

45,533.—Seeding Machine.—Julius M. Stebbins, Appleton, Wis.:

I claim, first, The use of two series of cylinders, A A^1, revolved upon a single shaft, J, with sliding rings, C C^1, operating as and for the purpose set forth.

Second, The double extension or dividing cap, B, with two orifices, O and O^1, substantially as described. Also its use in combination with revolving cylinders for gaging the discharge of two or more kinds of seed at the same time.

Third, The use of a beveled flange, H H, when used substantially as and for the purpose set forth. Also its use in combination with a funnel or cylinder, substantially as described.

45,534.—Process for Amalgamating Ores.—W. F. Stewart, of Austin, Nevada Ter.:

I claim a new and improved mode of working silver ores and saving amalgam and quicksilver, as above described.

45,535.—Angle Protractors.—Henry Taylor, of the U. S. Navy :

I claim the radius arm, E, provided with a suitable scale, and operating in combination with the revolving compass circle, D, which is adjustable on the graduated scale, B, and with the parallel rulers, A, substantially in the manner and for the purpose herein shown and described.

[This invention is particularly intended to facilitate the operations of laying off courses on board ships, and of locating a ship's position on a chart from cross-bearings, and also the operation of plotting a day's work, rendering it unnecessary to keep a traverse table of corrected courses, and the operation of ascertaining bearings between points. It may also be used with advantage in drafting, surveying and other operations of a similar nature.]

45,536.—Safes.—W. R. Terwilliger and Daniel Fitzgerald, of New York City. Ante-dated April 26, 1864 :

We claim, first, Making a safe, or the walls of a safe, proof against burglar tools, by casting hard iron over a core prepared by punching three sides of the holes and turning out the metal, in the manner described.

Second, Making the tongues, B, which are turned out by punching of a dovetail form, so that they will hold the iron when cast upon it in the manner described.

Third, Turning out the dovetail tongues on the opposite sides, for the more perfect holding the metal, in the manner described.

45,537.—Treating Wood for the Manufacture of Boxes, Cases, Etc.—Horace Thayer, of Warsaw, N. Y.:

I claim the within-described method of manufacture of ends or heads for boxes, and analogous structures, the wood being steamed, sliced, seasoned, cut in shape, coated or filled with an insoluble varnish, and dried, smoothed and finished in the order and by the means substantially as herein set forth.

45,538.—Ends or Heads for Boxes, Cases, Etc.—Horace Thayer, of Warsaw, N. Y.:

I claim as a new article of manufacture and commerce the ends or heads described, for boxes and analagous structure, the same being formed of wood or analogous porous material, coated or filled with an insoluble varnish, so as to combine the qualities of cheapness, elasticity, stiffness and impenetrability, as herein set forth.

45,539.—Sewer Pipes.—George S. Tiffany, of Palmyra, Mich.:

I claim making the shaft, D, of the grinding mill tubular, in combination with the central shaft, K, having casting, P, and cove-pin, R, thereon, and funnel, G, arranged to operate substantially as and for the purpose herein set forth.

45,540.—Horse Power.—A. W. Tooker, of Chemung, Ill.:

I claim communicating a rotary motion to the driving shaft, D, from the master wheel, B, by means of convergent shafts, C C^1, carrying spirally-flanged drum, G G^1, which are acted upon by means of friction rollers, applied to the master wheel, substantially as and for the purposes described.

45,541.—Stove-cover Lifter.—Sylvenus Walker, of Tremont, N. Y.:

I claim as a new article of manufacture, a stove-cover lifter, tack drawer, plate and dish lifter, pot and kettle-lifter combined, consisting of handle, A, lifter, B, tack-drawer, c, lifter, C, with claws, F G H I, and hook, E, when combined and arranged as described, for the purpose set forth.

45,542.—Camp Kit.—Jacob Walkley, of Monroe, Wis.:

I claim, first, Constructing a packing case by the union of the plates, A and B, substantially as and for the purpose set forth.

Second, I claim forming a handle for the frying pan, C, by means of the spoon, a, substantially as set forth.

Third, In combination with the packing case, constructed as shown, the coffee pot, cups, boxes and other articles, substantially as shown and described.

45,543.—Process of Brewing Malt Liquors.—Chas. R. M. Wall, of Brooklyn, N. Y.:

I claim, first, Increasing the specific gravity of the mash by the addition of sugar or molasses, in about the proportion specified, for the purposes herein set forth.

Second, Boiling the wort or extract of malt under pressure higher than that of the ordinary atmosphere, substantially as and for the purpose described.

[This process differs from the ordinary process; first, in the manner of treating the malt before grinding; second, in the manner of treating the mash and of boiling the wort, or extract of malt, after the same has been separated from the malt; third, in the manner of boiling the wort preparatory to introducing the same in the fermenting tubs, and during the fermenting process.]

45,544.—Churns.—C. A. Warren and A. C. Baldwin, of Tiffany, Ohio :

We claim, first, Attaching the crank, C, to the wheel, g, by means of a tenon, h, formed on this wheel, and a socket formed in the crank, in combination with the screw-fastening, i, substantially as described.

Second, Applying the dashers, D D, to the shaft, B, in oblique planes to the axis of this shaft, substantially as shown in figure 3.

Third, The removable inclined deflecting board, G, arranged within the chamber, substantially as described.

Fourth, The construction of the chamber, A, with a secondary bottom or shelf, A2, substantially as described.

45,545.—Brake for Railroad Cars.—Lewis Watson, South Plymouth, Mich.:

I claim, first, The construction and operation of the apparatus herein described, consisting of the combination of the friction plate, A, and friction wheel, B, with the car wheel to which it is attached, the chain, C, and ring, D, pawl and spring, E, screw, F, and burr, G.

Second, I also claim the combination of the weight, H, friction collar, I, and collar, K, chain, L, and chain, M, and shaft, N, when constructed and operating substantially as and for the purposes herein shown and described.

45,546.—Machine for making Shovel Handles.—William Wells, Middletown, Mass.:

I claim, first, Clamping the shovel handle both at its head and along its shank by means of the clamp, O, and bar, H, with its forks, h h, during the operations above described, substantially as above set forth.

Second, I also claim completing the D-opening in the head of the shovel handle, by means of the suspended vertical die-cutters, e e, of different sizes, operated in succession and brought vertically over the shovel head, substantially as described.

Third, I also claim the swinging bed piece and its cutter, u, for forming the end of the shovel head, constructed and arranged substantially as above described.

[This invention consists in a novel construction of machinery for cutting out and finishing the "D-part" or heads of shovel handles, in which the cutters are operated automatically by means of combs.]

45,547.—Spinning Jack.—Frederick C. Werner, Beacon Falls, Conn.:

I claim the movable bar, f, applied in combination with the belt shipper, J, carriage, A, and tappet, g, in the manner and for the purpose substantially as set forth

45,548.—Street Sweeping Machine.—M. F. Wickersham, Springfield, Ill. Ante-dated Dec. 25, 1862 :

I claim, first, The combination of the main frame, D, with the overhanging frame, E, and elevating buckets, H, when the rear end of said main frame is made to extend so as to counterbalance the frame, E, with its buckets, H, and chain wheel, F, and furnish a purchase by which said overhanging frame may be raised or lowered.

Second, The combination of the vibrating brush frame, J, with the elevating buckets, H, and driving wheel, M, so that the brush can move up or down without ungearing and at the same time throw the dirt in the buckets as set forth, while it follows the uneven surface of the ground.

45,549.—Corn Cultivator.—Daniel Wilde, Washington, D. C.:

I claim, first, The levers, u, resting on the front bar of the frame and supported near the middle by the notched plates, w, secured to the uprights, x, and operating as and for the purposes herein recited.

Second, I claim the arrangement of the rocking bar, g, elevated bar, m, in relation to the handles and the shovel stakes, for the purpose herein set forth.

Third, And in connection with the arrangement of the rocking bar, g, bar, m, and the shovel stakes, I claim the stirrups, q, for the purpose herein named.

Fourth, I claim the plate, j, with its inclined and horizontal faces, k and l, for the purpose herein set forth

45,550.—Harvester.—John S. Williams, Chicago, Ill.:

I claim, first, The plate, F, provided with the rod, q, substantially as herein set forth.

Second The combination and arrangement of the pitman rod, the jointed lever, o, and the fulcrum, p, when operating substantially as described.

Third, I claim the combination and arrangement of the lever, v, the connecting rod, x, the lever, y, the fulcrum, s, and the arm, r, when operating substantially as and for the purpose described.

Fourth, The combination and arrangement of the axle, N, the frame, W, and the platform, I, when constructed substantially as herein specified.

45,551.—Pump.—Francis G. Wynkoop, Corning, N. Y. Ante-dated April 29, 1863 :

I claim the annular piece of rubber, d, provided with an inclined inner face, c, in combination with the piston and loose valve plate, g, when arranged to operate in the manner substantially as described, also in combination with the above the rubber gasket, I, arranged in the manner and for the purpose specified.

[The invention consists in the use of an annular piece of rubber fitting the inclined or conical face of the piston, in combination with a metallic disk or valve plate, whereby the rubber, by the weight of the superincumbent water, is expanded and caused to fill the space between the piston and chamber during the ascent of the former and is retracted or restored to its original shape by its resiliency and that of the gaskets aided by the force of the water passing through the valves of the piston during the ascent of the latter; thus entirely relieving the packing or annular pieces of rubber from contact with the chamber, and at the same time allowing it to lubricate and free itself from any sediment or sand which may have been drawn into the chamber by the water passing through the space between and the chamber.]

45,552.—Construction of Railways.—Theodore Yates, Milwaukie, Wis.,

I claim the combination of the T-rail, A, wooden subrails or longitudinal sleepers, B, and the clamps or chairs, D, or their several equivalents, arranged and employed in the described combination with the longitudinal subrails, B, substantially in the manner and for the purposes herein set forth.

I also claim the clamp, D, constructed in one piece as described, and employed in the described combination with the longitudinal subrails, B, to secure the iron rails at their joints and protect the wooden subrails beneath said joints, as set forth.

[This invention relates to a railway in which the common rails are so applied and secured to subrails or longitudinal sleepers, resting upon the ties, that the track is rendered more firm and durable, and less liable to derangement than when laid in the ordinary manner.]

45,553.—Bung Stave for Barrels—Annie Acker, Administratrix of the estate of Frederick Acker, deceased, San Francisco, Cal.:

I claim the metallic stave or segment of stave, A, provided with longitudinal tongues, d d, and threaded for the reception of a screw plug or bung, B, substantially as herein described.

45,554.—Match Safe.—Wm. H. Andrews (assignor to Burton Mallory), New Haven, Conn.:

I claim a metallic box, constructed and made self-closing, as and for the purpose described.

45,555.—Turning Lathe.—Charles G. Bloomer, Wickford, N. Y., assignor to Eberhard Faber, New York City :

I claim, first, The employment or use for the purpose of feeding the stuff to be turned to the tools, of a screw thread cut in the guide, substantially in the manner and for the purpose described.

Second, The forked guide, E, made in two parts one of which is hinged and arranged to swing open when desired, the whole being constructed so as to straddle the roughing out tool, substantially as and for the purpose set forth.

Third, The employment of a rotating cam, h, applied in combination with the roughing out tool, in the manner and for the purpose substantially as described.

Fourth, The combination of the yielding head, t, with the cutting off tool, s, arranged substantially as and for the purpose specified.

45,556.—Stove Pipe Drum.—Peter Cocker (assignor to himself and John Taylor), Philadelphia, Pa.:

I claim constructing a stove pipe with a jacket divided into flues connecting with the main pipe or flue, the draft of which being controlled by a damper in the main pipe, as described and for the above purpose.

45,557.—Hoop Skirt.—Smith Collins (assignor to himself and Samuel Peck), New Haven, Conn.:

I claim a hoop skirt when the hoops are formed from corrugated or concavo-convex wire, substantially as and for the purpose specified.

45,558.—Tobacco Press.—John H. Fellows, Lewisport, Ky., assignor to himself and D. Dunn, Louisville, Ky.:

I claim the toggle arms, D D^1, windlass, E, and follower, C, in combination with the balance weight, k, constructed and operating substantially as and for the purpose set forth.

[This invention consists in the application of two pairs of toggle arms acted upon by a rope and windlass, and of a balance weight suspended from a suitable rope running over pulleys in combination with the press bar or follower of a press, in such a manner that by the action of the windlass and toggle arms the follower can be depressed with great force, and on releasing the toggle arms the follower is carried back to its original position by the action of the balance weight, without the aid of the operator, or with very little exertion on his part.]

45,559.—Double-acting Compress.—John H. Fellows, Lewisport, Ky., assignor to himself and D. Dunn, Louisville, Ky.:

I claim the followers, E E^1, connected by rods or other equivalent means to followers, F F^1, and operating in combination with the cross head, c, and toggle arms, D, in the manner and for the purpose substantially as set forth.

This invention consists in combining two pair of sliding followers with each other and with an intermediate cross head and pair of toggle arms in such a manner that by imparting to the cross head a longitudinally sliding motion in the proper direction, the two pairs of followers, situated on either side of the cross head, are caused to close up, and by moving the cross head in the opposite direction the followers are caused to open simultaneously, and by this arrangement two bales of cotton, hay, or other material can be pressed at once and in the same time, which, with presses of the ordinary construction, is occupied in pressing one bale.]

45,560.—Magazine or Self-loading Fire-arm.—Joshua Gray, Medford, Mass., assignor to himself, E. H. Eldridge, S. S. Bucklin and W. G. Langden :

I claim, first, The rack, F, arranged below the sector, D, for the purpose described.

Second, Moving the cartridge carrier from the magazine to the barrel, and vice versa, by passing it through a longitudinal slot in the breech pin and sliding the latter over it.

Third, So constructing the end of the cartridge lifter as to cover the port of the magazine, when the rifle is used as a breech-loader.

Fourth, The slot, L, to guide the cover or end, K, of the cartridge carrier, as described.

Fifth, The cartridge extractor, M, in combination with the arm, N, provided with the knob, e, or its equivalent, as described.

Sixth, The cam, R, in combination with the hooked lever, S, or their equivalent, for the purpose of withdrawing the cartridge case without uncovering the magazine, when it is required to use the rifle as a breech-loader.

Seventh, The guide pin, H, in combination with the groove, I, for stopping and guiding the breech pin, as described.

45,561.—Manufacture of Sugar.—F. W. Goepling (assignor to H. F. Briggs, L. Bradley and himself), of Buffalo, N. Y.:

I claim a new and improved compound sugar made by a combina-

tion of cane sugar or cane sirup with corn sirup, substantially as set forth.

45,562.—Method of Removing Harbor Obstructions.—John D. Hall (assignor to himself and Osborn Conrad), of Philadelphia, Pa.:

I claim the employment of a cannon, in connection with the jaw, B, and the adjustable inclined plane or spars, A, and fork, n, attached to a monitor or other vessel, for the purpose of removing obstructions from harbors, channels, etc., substantially as described.

45,563.—Brick-pressing Machine.—James Hotchkiss (assignor to himself and Ezra Buss), of Springfield, Ohio:

I claim imparting the pressure to the bricks by means of two stationary pressure wheels, P Q, between which the mold wheel passes continuously, substantially in the manner herein specified.

I also claim such arrangement of the pressure wheel, P Q, that the upper wheel shall simply hold the lids closely and firmly down upon the mold wheel, while the active pressure is produced by the lower wheel, lifting the followers, substantially as herein set forth.

I also claim regulating the pressure and the thickness of the bricks by adjusting the bearing blocks, r r, of the lower pressure wheel, Q, as herein described.

I also claim hinging the lids, F G H I, to the mold wheel, so that they shall swing and shut directly down over the molds, and be raised directly up therefrom, substantially as and for the purpose herein specified.

I also claim the arrangement of the cam guides, M N, in combination with lids, F G H I, substantially as and for the purpose herein specified.

I also claim the construction and arrangement of the cam tracks, m n p, in combination with the followers, substantially as herein set forth.

I also claim the combination of the vertically-closing and opening lids, F G H I, with the forms for imprinting on the lower surfaces thereof, for the purpose herein specified.

45,564.—Raising and Lowering Window Sashes.—John M. Merrymon, of Indianapolis, Ind., assignor to himself and Wm. Gorsuch, of Richmond, Ind., and Kilby Ferguson, of Indianapolis, Ind.:

I claim the use and application of one continuous cord, c, in the manner and for the purposes as herein described.

45,565.—Machine for Cutting Objects with Straight Sides and Semi-Circular Ends.—Charles W. Packer (assignor to himself and George Bates), of Philadelphia, Pa.:

I claim, first, A slotted plate with straight parallelled edges and semi-circular ends, guided by the pin, h, and strip, p, in combination with the rotary cutters, or their equivalents.

Second, So constructing the said plate of two pieces, I and I', that it can be elongated or shortened at pleasure.

45,566.—Detached Shirt Collar and Bosom.—Celius E. Richards, of North Attleboro', Mass., assignor to Wm. H. Conant, of Boston, Mass., and Geo. A. Shephardson, of Attleboro', Mass.:

I claim, first, Stamping the collar and bosom in one piece, substantially as set forth.

Second, In combination with such collar and bosom and the cravat bow, made as described, I claim the cord, D, and fastening, C, or its equivalent, the same being substantially as and to operate in manner and for the purpose as explained.

45,567.—Sabot for Projectiles for Rifled Ordnance.—C. W. Stafford (assignor to American Projectile Company), of New York City:

I claim the cup-shaped packing disk, D, provided with an annular flange, F, fitting upon a wedge-shaped rebate, G, as herein described and for the purpose set forth.

45,568.—Apparatus for Vaporizing and Aerating Volatile Hydro-carbons.—Levi Stevens, of Fitchburg, Mass., assignor to himself and John D. Sargent, of Boston, Mass.:

I claim the combination of a flowage regulator, for the purpose hereinbefore explained, with an apparatus for vaporizing and aerating a volatile hydro-carbon, the said regulator being made to receive the hydro carbon from a reservoir, and to operate substantially as hereinbefore described.

I also claim the flowage regulator, made substantially as hereinbefore explained, and with its inlet air to be either stationary or capable of being adjusted in manner and for the purpose as set forth.

I also claim the improved hydro-carbon vaporizer, constructed substantially as described, with the chamber, r, the foraminous plates, l and m, and the pipes, n o, arranged and combined together, and with the surrounding case or vessel, z, in which they are placed, substantially as described.

45,569.—Method of Preparing and Preserving Food.—John McCall, of London, Eng., and Bevan G. Sloper, of Walthamstow, Eng., assignors to Charles J., William J., and Charles H. Underwood, of Boston, Mass. Patented in England April 9, 1864:

We claim the within-described constructed food tablets, prepared substantially in the manner set forth.

RE-ISSUE.

1,834.—Railroad Car Axle Boxes.—R. N. Allen, of Cleveland, Ohio.—Patented March 23, 1858:

I claim, first, Constructing the cavity on the inside of the case, E, in such manner as to allow an easy adjustment of collars or washers on the axle, through the front opening of the case, substantially as set forth.

Second, I claim the employment or use of the collar or washer, F, in combination with the case, when said collar or washer is adjusted to and in its place on the axle through the front opening of said case, substantially as and for the purpose set forth.

Third, I claim the movable brace, G, and the end of the key, C, in combination for holding the washers in their place against the back end of the case, substantially as set forth.

Fourth, I claim the described curved surface on the upper side of the bearing box, B, on either side of the key, C, or on the inner surface of the case, in combination with the bearing box or key, for the purpose set forth.

1,835.—Apparatus for Forming Collars.—Solomon S. Gray, of Boston, Mass. (Div. A.) Patented July 5, 1864:

I claim, first, The combination of the former, D, with the elastic band or its equivalent when operating sustantially as herein described.

I also claim holding the strip or collar by its two ends, while the former is being forced into or through it, to mold it to the desired form, substantially as described.

I also claim leaving that portion of the strip or collar that is to be molded unclamped or free, while the other portion is firmly held, so that a former moving past it may mold or stretch said free portion, as described.

1,836.—Apparatus for Forming Collars.—Solomon S. Gray, of Boston, Mass. (Div. B.) Patented July 5, 1864:

I claim, as an article of manufacture, a paper, or a paper and cloth collar, having its upper or turned over portion, molded or stretched, substantially as and for the purpose herein set forth.

1,837.—Apparatus for Boring Artesian Wells.—Henry Hannen and John Parker (assignees by mesne assignment of Jesse N. Bolles), of Philadelphia, Pa. Patented April 14, 1857:

I claim, first, The combination of a drill or cutter, A, with tubular rods, through which the detritus is caused to pass upward, and to be discharged at the point described, substantially as specified.

Second, One or more valves, f, arranged within the tubular drill rods of a well-boring machine, substantially as and for the purpose set forth.

Third, The drill or cutter, A, composed of the portions, a a, and cross piece, b, constructed and arranged substantially as and for the purpose set forth.

1,838.—Harvesting Machines.—A. Kirbey and David M. Osborne (assignees of Wm. A. Kirbey, aforesaid), of Auburn, N. Y. Patented July 2, 1861. Re-issued June 9, 1863:

I claim, first, In combination with an automatic rake, an adjustable shaft, for the purpose and in the manner substantially as described.

Second, In combination with an adjustable shaft of an automatic rake, the universal joint, k', for the purpose and in the manner substantially as described.

Third, In a harvesting machine, having an adjustable connection between that part which carries the automatic rake, and that part which carries the gearing, the adjustable shaft and universal joint, substantially as and for the purpose described.

1,839.—Revolving Fire-arms.—The Brooklyn Fire-arms Company (assignee by mesne assignment of Frank P. Slocum), of Brooklyn, N. Y. Patented April 14, 1863:

I claim, first, The construction of a revolving fire-arm, with independent longitudinally-movable chambers, in combination with openings in the sides of the cylinder of sufficient size to permit the lateral insertion of metallic cartridges, without removing the chambers entirely from the cylinder.

Second, The stationary piston, applied in combination with the revolving cylinder, and its independently-movable chambers, substantially as and for the purpose herein described.

Third, The projection, f f, on the longitudinally-movable chambers, D D, in combination with the longitudinal openings, C C, of the cylinder, substantially as and for the purpose herein specified.

Fourth, The notches, z z, in the sides of the longitudinal openings, C C, of the cylinder, in combination with the projections, f f, on the longitudinally-movable chambers, substantially as and for the purpose herein set forth.

DESIGNS.

2,016.—Match Box.—Edward Burke, of Philadelphia, Pa.

2,017.—Trade Mark.—Israel A. Powell, of Lawrenceville, Ill.



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.

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

The Patent Laws, enacted by Congress on the 2d of March, 1861, 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 invention 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 think 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.

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.

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

C. C., of Conn.—The best test for the presence of lead in water is sulphuretted hydrogen, which produces a black deposit.

D. McD., of Wis.—The weight is, as you say, the principal objection to traction engines for plowing, reaping, etc. In England they are used to some extent in dockyards, but the use does not seem to extend very rapidly, probably because there are few places in which they are more convenient than horses.

J. H., of Pa.—You will find the geology of petroleum very fully stated in No. 20 of our last volume, pages 308, 314 and 315.

J. S. T., of Va.—We do not know of any place where a diagonal connection between a brace and bit can be had. Get some mechanic to make one.

J. E., of Mass.—Buy "Bourne's Catechism," it is far better than Campin's work. H. C. Baird, 406 Walnut street, Philadelphia, will furnish it.

T. F. C., of Wis.—A slide has been used to cover the outside keyhole when the door is locked. If you will submit to us a sketch of yours we will give our opinion in regard to it.

O. B., of Mo.—The Justice must affix to the oath attached to the specification a five cent revenue stamp. The certificate of an individual who has witnessed the operation of a machine does not require a stamp.

E. S. V., of Pa.—We gave Mr. Burns address in our paper in connection with his letter. If you desire to reach him more particularly with your invention, you had better advertise it in our paper.

B. E. C., of S. C.—We shall be glad to receive from you an article upon the salt deposit upon steam boilers.

D. S., of Mass.—The cheapest plan for making hydrogen on a large scale is by decomposing water by means of heated charcoal or coke; zinc is a very costly material for this purpose. You can easily try an asbestos wick and see whether it will work.

E. J., of Mass.—Ivory is bleached by soaking it in water, and exposing it to the action of the sun.

Money Received

At the Scientific American Office, on account of Patent Office business, from Wednesday, Dec. 14, 1864, to Wednesday. Dec. 21, 1864:—

T. L., of N. Y., $30; H. W. H., of Conn., $20; I. F. B., of Conn., $20; M. C. D., of Ohio, $20; J. H. S., of N. Y., $20; H. Y., of N. Y. $30; C. F. B., of N. Y., $45; J. S., of Ill., $45; F. L., of N. Y., $15; J. P., of N. J., $45; H. & W., of Cal., $25; H. B., of N. Y., $15; W. H. S., of N. Y., $20; T. S., of N. Y., $20; J. M., of N. Y., $40; J. B., of N. Y., $20; D. C. H., of Pa., $20; J. McG., of N. Y., $10; C. C., of Conn., $45; W. & S., of Pa., $30; J. C. G., of N. J., $15; C. M. & G. R., of N. Y., $15; A. T. B., of N. Y., $25; B. & M., of N. Y., $45; W. H., of N. Y., $15; Z. P. L., of Conn., $20; J. & N. W. R., of Mass., $25; D. S., of Cal., $20; H. H., of Ill., $30; L. H., of N. Y., $22; O. R. B., of N. Y., $40; J. T. P. H., of N. H., $45; P. W., of Minn., $20; J. W. N., of Conn., $40; J. F., of N. Y., $15; A. B., of N. Y., $30; E. H., of Ill., $30; W. N., of Mass., $25; J. S., of N. Y., $20; B. F., of N. J., $10; J. L., of Conn., $15; J. J. R., of Ill., $25; J. A. R., of Pa., $16; W. G. B., of Mass., $20; A. M., of N. Y., $15; W. S., of N. Y., $22; W. & McG., of Iowa, $20; C. H. B., of N. Y., $40; G. W., of Mass., $20; M. R. H., of N. J., $45; G. M., of N. Y., $40; G. E. H., of Maine, $20; T. N. D., of Ind., $20; J. M. F., of Ill., $20; H. M. H., of N. Y., $45; D. H. H., of Ohio, $45; A. & F., of N. Y., $15; T. V. W., of N. Y., $10; E. H. M., of Iowa, $20; J. C. S., of Mass., $20; A. K., of Ill., $20; W. K. L., of Mass., $16; J. C., of Ill., $15; J. A., of Ill., $30; J. C. & G. S., of Mass., $16; C. H. S., of Ill., $45; W. R. L., of Conn., $15; J. R., of Ind., $25; T. J. L., of R. I., $15; W. H. & G. W. M., of Conn., $45; D. F. W., of Ky., $25; W. E. R., of Ill., $15; W. C., of Ohio, $15; J. B., of N. Y., $15; L. & D., of Canada, $25; H. & C., of Mich., $35; A. H. W., of Maine, $15; H. K. J., of Conn., $40; B. F. W., of Ind., $16; R. & C., of Conn., $25; E. B. T., of Mass., $16; J. C., of N. Y., $25; J. L., of Mass., $25; E. W. S. & Co., of Wis., $16; J. L. B., of Pa., $15; L. A. P., of Ill., $25; F. M. G., of Pa., $25; G. W. S., of Pa., $15; D. McC., of Ohio, $25; J. H. N., of N. Y., $15; S. J. C., of Conn., $25; H. H., of N. Y., $10; C. H. P., of N. Y., $16; I. N., of Mass., $25; T. L. S., of Mass., $50; V. W. B., of Vt., $15; F. G. F., of Ill., $15; E. & K., of Pa., $53; E. N., of La., $20; F. W. E., of Mich., $20; W. L. C., of Wis., $10; T. R., of Cal., $25; T. H. C., of Mo., $40; D. G. F., of Wis., $15; M. H., of Mich., $10; J. F. W., of N. H., $16; W. F., of Conn., $15; J. H. P., of Mich., $15; J. B., of Ill., $30; Mrs. L. E. S., of Ill., $25; J. M. C., of Mass., $15; A. & H., of Conn., $250; T. M., of N. Y., $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, Dec. 14, 1864, to Wednesday, Dec. 21, 1864:—

T. L., of N. Y.; A. T. B., of N. Y.; G. M., of N. Y.; H. M. H., of N. Y.; W. & S., of Pa.; D. F. W., of Ky.; J. J. R., of Ill.; R. & McM., of Ky.; O. P. S., of Ill.; K. & E., of Pa.; J. N., of Mass.; R. & C., of Conn.; A. K., of Pa.; W. S., of N. Y.; O. R. B., of N. Y.; C. H. S., of Ill.; I. A. P., of Ill.; J. C. G., of N. J.; J. L., of Mass.; J. E., of Cal.; S. J. C., of Conn.; H. C., of Maine; T. L. J., of Mass. (2 cases); H. L., of Iowa; A. P. D., of N. J.; C. H. B., of N. Y.; J. W. N., of Conn.; D. McC., of Ohio; T. R., of Cal.; J. C., of N. Y.; J. R., of Ind.; W. H. & G. W. M., of Conn.; C. H. S., of N. Y.; Mrs. L. E. S., of Ill.; C. D. P., of Cuba; L. H., of N. Y.; T. M., of N. Y.; S. & B., of Mich.; F. M. G., of N. Y.; A. & G. W., of Iowa; J. G., of Mich.; H. K. J., of Conn.

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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 ten 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.

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TERMS FOR VOL. II. 1865

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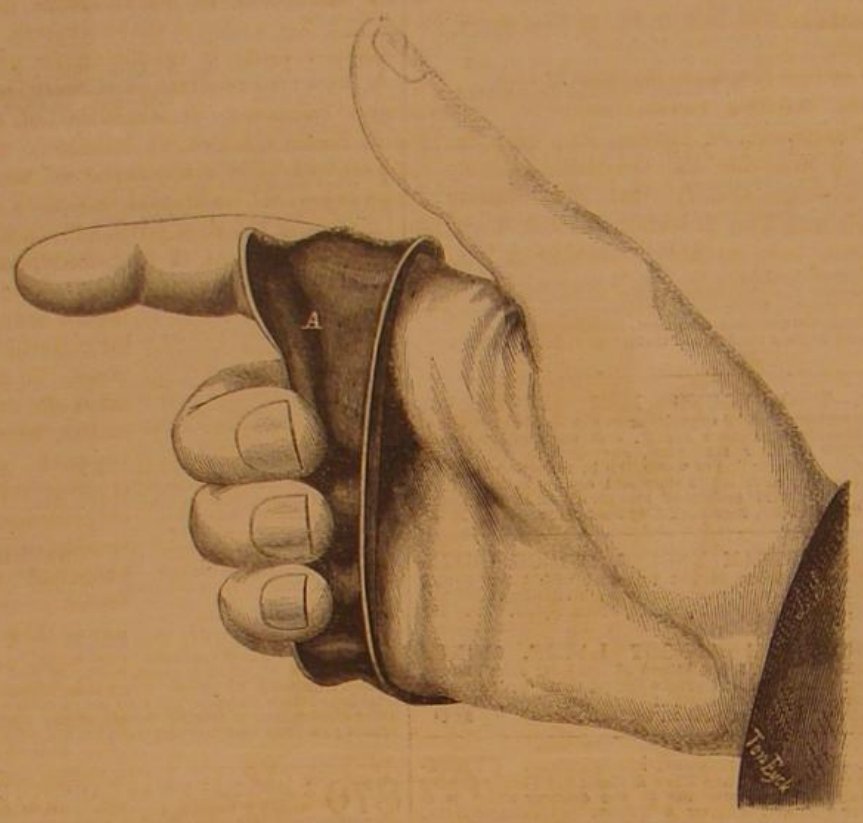
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This invention has now been in use for two years and has given perfect satisfaction. The inventors say they have not be able thus far to supply the great demand for them.



BRINKERHOFF'S OHIO CORN HUSKER.

This invention was patented by A. W. Brinkerhoff, of Upper Sandusky, Ohio, Sept. 2, 1862, and is manufactured by Messrs. Wood, Fowler & Beery, of the same place. They are sold for fifty cents each, with discount to dealers.

For further particulars apply to either of the above parties, at Upper Sandusky, Ohio.

No territory for sale.

Preparation and Properties of Rubidium.

In the *Annalen der Chemie und Pharmacie*, Prof. Runsen gives an account of his last experiments on rubidium. The latter may be reduced from carbonated acidiferous 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° Fah., it is still as soft as wax; it becomes liquid at 101·3° Fah., and in red heat it is transformed into a greenish-blue vapor. The specific gravity of rubidium is about 1·52. It is much more electropositive 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.

Preserving Flowers.

Mr. C. R. Tichborne states that, being desirous of preserving a vegetable *lusus naturæ* for some time, he submerged it in some weak glycerine, considering that that fluid would be less likely to destroy the tender organism, and also remembering that it had been found most efficient in the preservation of animal tissues. The glycerine answered its purpose most admirably, preserving the delicate parts of the plant and preventing decomposition. He immediately saw that this property of glycerine might be made available for certain pharmaceutical purposes, where it was desired to preserve or extract the aromata of vegetable products, such as elder, orange, or rose flowers, and also might be substituted for the oils and fats used in the purest process termed enfleurage. The glycerine need not be especially pure, but should be devoid of odor. The elder-flowers should be gathered when the corolla is fully expanded, but not too far gone; they should then be plucked from the stem, and packed firmly in wide-mouthed bottles or jars, without crushing them; and the whole should then be covered with glycerine. Mr. Tichborne says that he has thus preserved flowers for two years, and, on distilling them, procured a water, the perfume of which has equalled the most recent product. For the preservation of the flowers he considers the employment of glycerine far superior to the system termed enfleurage, in which heat is used.

PORTER'S SIFTER SHOVEL.

Every economical housekeeper sifts the ashes and refuse coal left after the fire has been turned out at night. By so doing a very marked saving occurs, fully equal to one-third of the whole ash heap.



A shovel which combines a sifter with its other qualities is a very convenient article for the purpose referred to; the one here illustrated is well designed for the object in view. It is made of cast-iron and has a grating at the back part for the ashes to fall through. This shovel is also useful for carrying fire from one place to another, for by the introduction of the grate a draft is maintained which keeps the coals alive much longer than ordinary shovels. A patent was issued to J. H. Porter on the 3d of December, 1864, through the Scientific American Patent Agency. For further information address him at 15 Hudson street, New York.

Silk Worms for France.—The San Francisco *Bulletin* says: "Macondray & Co. will ship by the *Constitution*, 64 cases of silk worms, which were recently received from Japan, on an order for parties in France. They will be conveyed to New York and thence to Havre. The French silk worms have become diseased, and it is proposed to try the experiment of restoring them to health by admixture with a new stock, or by substituting the latter for them entirely. The Japanese worms produce a very good quality of silk. It may not be generally known in this connection that Provost, the California silk culturist, has for a considerable time been forwarding his healthy larvæ to France."

TO

INVENTORS, MECHANICS, AGRICULTURALISTS.

THE ANNUAL

PROSPECTUS

OF THE

Scientific American,

THE CHEAPEST AND BEST

MECHANICAL JOURNAL IN THE WORLD,

A NEW VOLUME OF WHICH COMMENCES

JANUARY 1, 1865.

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Vol. XII.---No. 3. (NEW SERIES.)

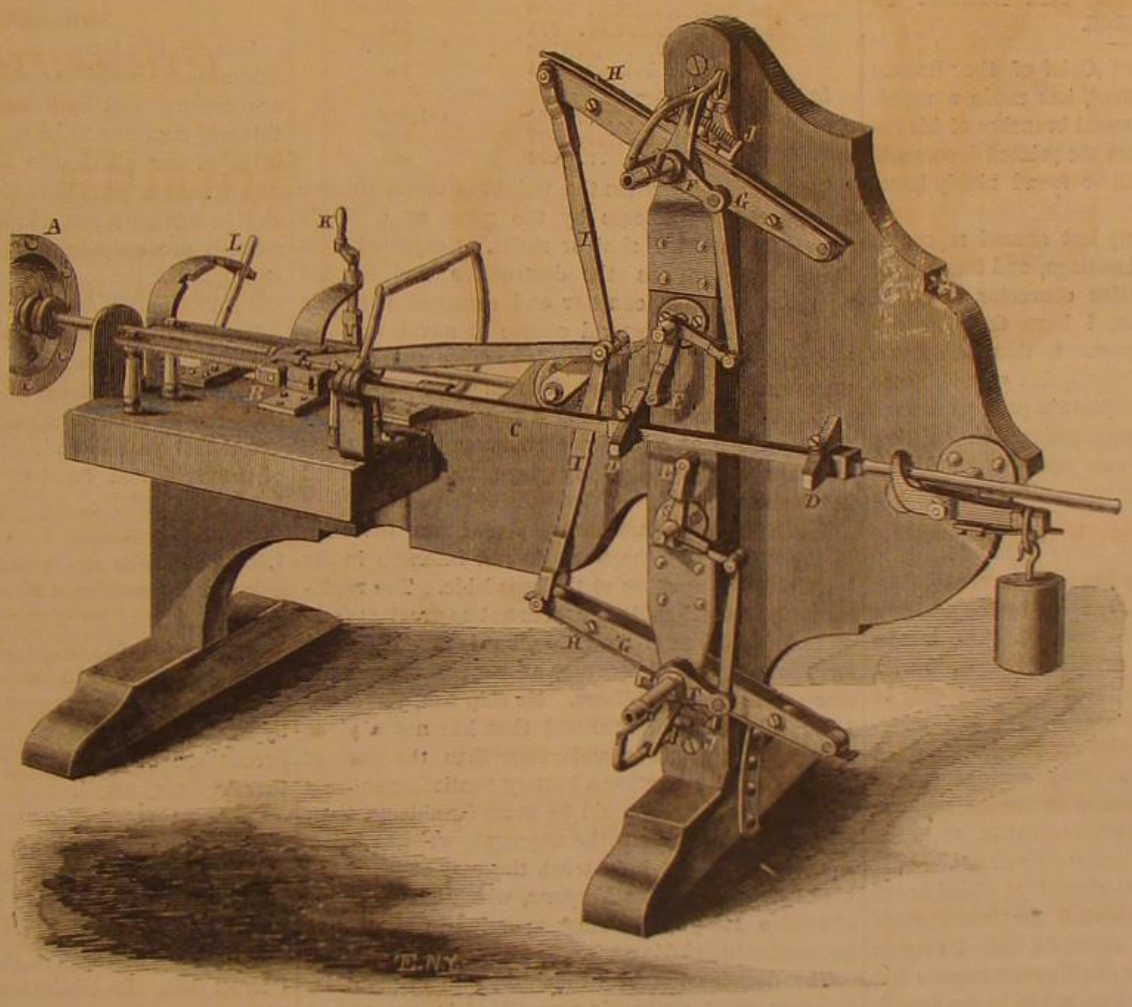
NEW YORK, JANUARY 14, 1865.

$3 PER ANNUM (IN ADVANCE.)

Improved "Dead-center Lift."

This machine is intended to lift the cranks of steam engines over their centers. We append the inventor's description:—

"The great danger to life and property caused by the cranks of steam engines stopping on the dead centers, is well known to every practical engineer. Steamboats, when about to make a landing, have been seriously injured by the crank getting on the dead center, thereby making it utterly impossible for the engineer to manage the boat. Before men can be called from their various occupations to go to the wheel, or get a lever and force the crank over, many very serious and oftentimes fatal accidents occur, since the most careful engineer cannot prevent the difficulty from frequently occurring. The invention called the Dead-center Lift, which I have patented in the United States and Great Britain, renders it utterly impossible for this difficulty to happen. By a simple mechanical arrangement a sufficient amount of power is stored up to take the crank over, it being at all times under the control of steam. There is another advantage in my invention which renders it especially valuable to steamboat engines and other machinery, which is, in economising the power lost by friction on the crank when the machinery motion is comparatively slow."



GORMAN'S "DEAD-CENTER LIFT."

The following description will render the principal details of this invention clear to all. The cylinder, A, has a piston and rod as usual; to the latter a crosshead, B, is connected whereto the rod, C, is attached. This rod works through guides and has tappets, D, which strike the levers, E, when the engine is at work. As these levers move they act on the arms, F, which in turn causes the beam, G, to vibrate on its axis. At the backs of these beams there are springs, H, which exert a downward pressure upon the beam. When one end of the upper beam is depressed the force of the spring bears upon the upper end, which force, being transmitted through the link, I, acts directly on the pin of the crank when the same is on the center or dead point. This action always takes place alternately, above and below the pin, when the engine is at work.

There is an arrangement on the beam, G, by which the springs can be tightened or rendered stiffer as they "set" from continuous action. This is effected by causing the slides, J, to move out toward the ends of the beams; it can be done at any time when the engine runs by turning the handle, K. The action of the engine can be reversed by turning the tappet shaft over with the lever, L. The inventor of this device is desirous of introducing it in public service.

It is patented in England, France and Belgium, through the Scientific American Patent Agency, on the 9th of August, 1864, by Jas. J. Gorman. For further particulars address him at No. 20 New street, Cincinnati, Ohio.

Coal Mining Invention.

Mr. James Westerman, of Sharon, Pa., and Mr. John S. Furks, of Meadville, Pa., the latter formerly a citizen of Cuyahoga County, Ohio, and latterly master mechanic with Van Brocklan, Jones & Ward, Youngstown, Ohio, have invented a machine for mining coal. The machine is simple in its structure, and consists of a small carriage mounted upon trucks, upon which is mounted a circular saw with a self-feeding attachment, arranged upon an upright shaft for the purpose of doing the "bearing in," as the miners term it, and to be propelled either by horse power, or by an engine driven by compressed air, by which means they accomplish the two-fold purpose of mining the coal and freeing the bank from all impure air. These gentlemen have been experimenting with saws with a view to mining for nearly a year, and as both of them are practical men and know well what is required, we have the fullest confidence in the success of their invention.

Utilisation of Small Coal.

Some few months since reference was made to an invention of Mr. Arthur Wall, from which he anticipated an extraordinary economy in the use of fuel both in connection with the manufacture of iron and in the generation of steam; and although the importance of the invention seems to have been somewhat exaggerated, it appears from the specification of he patent, which has now been published, that the suggestion might be turned to account in the rendering marketable of the enormous quantities of small coal now wasted at the pit's mouth. Mr. Wall's invention consists in combining (for use as fuel for steam-ships, locomotives, stationary engines, and domestic purposes, or otherwise) of the various bodies herein specified, by intimately mixing them together with other materials herein mentioned, and compressing the compound substance so obtained into masses or blocks of forms and sizes suitable for burning in furnaces of any description, so as to raise steam for land or marine boilers, or for use for domestic or other purposes. To effect this, he takes oils or oleaginous matter, whether animal, vegetable, or mineral, crude or refined Canada oil (commonly called petroleum or rock oil), paraffine, and mixes these bodies or substances, or any of them with pitch, tar, resin, or turpentine, or the refuse of these substances, turf, moss, or peat, and either singly or together combines them with sawdust or shavings, or other debris of wood or woody substances finely comminuted, and the substance so obtained he mixes with coal, coal dust, or slack, coke or cinders ground to powder or sifted fine, and when intimately mixed and ground together he passes them through a press and compresses them, when they are fit for use. When any combination is intended for steam purposes, whether for land or marine boilers, the best quality should be supplied, but for domestic purposes several qualities inferior thereto may be used with advantage. Mr. Wall considers that the mixed fuel, being composed of hydrogenous and carboniferous bodies, forms a kind of voltaic pile—the hydrogenous bodies constituting the positive pole, and the coal, cinders, &c., the negative pole. As his positive and negative elements are all finely divided, intimately mixed together—the carbonaceous matters being pulverised and kneaded with the oils which are to supply the hydrogen—and compressed, they are likely to act very nicely. He claims that his fuel, from its being formed of nearly pure hydrocarbons, will be found to consume its own smoke, and any that may arise from any other fuel that may be in contact or burned with it, besides yielding an astonishing amount of light and heat.—*London Mining Journal.*

Jacob's Wheel Working Machinery.

It was stated in our article accompanying the recent illustration of this ingenious machinery that the *entire* patents were for sale. This is incorrect. The *foreign* patents only are for sale, the company being now engaged actively in working their invention in this country.

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THE PLANTS AND ANIMALS OF THE PETROLEUM ROCKS.

[For the Scientific American.]

I have been to considerable labor to glean from numerous publications, both American and foreign, a complete list of all American vegetables and animals that lived in the latter part of the Devonian age of the world, an age which we may now emphatically call the oil age, preceding the coal age. I think it to be as perfect as can now be made out. It shows the large amount of material which then existed for the generation of petroleum, and when we remember that it is only the few species of the many that are petrified, and thus preserved—petrification being the exception and decay the general rule—we are surprised at the number of genera and species. The individuals are found by myriads, many feet of strata being filled with them.

TABLE OF UPPER DEVONIAN FAUNA AND FLORA.

	Plants.	Corals.	Bryozoa.	Echinoderms.	Molluscs.	Crustacea.	Fish.	Reptiles.
Genera.....	42	16	6	25	106	3	8	1
Species.....	106	29	10	71	479	31	16	1

Of the plants, 3 genera and 5 species were sea weeds, the rest were land plants. R. P. Stevens,
No. 244 Canal street, New York.

Dec. 20, 1864.

REPORT OF THE CHIEF OF THE BUREAU OF ORDNANCE.

H. A. Wise, the efficient Chief of the Bureau of Ordnance, Navy Department, has made a report of the transactions in the several branches of his department, and we extract from the printed documents the subjoined matter. It will be found highly interesting and instructive:—

The method adopted in my last annual report of dividing it into separate headings, and treating of each subject in its distinctive character, being in many respects advantageous, I have therefore followed it in the present report. It thus becomes a *resume* of the last, and, in connection with it, forms an historical record of the important part performed by the navy ordnance in suppressing the existing rebellion, and indicates the vast power at hand, and in course of preparation, for our national defence in the future.

THE ORDNANCE OF THE NAVY—1863–64.

The grand total of cannon has been increased during the year ending on Nov. 1, 1864, by the addition of 1,522 guns of the different calibers. The loss in guns sustained by the navy is trifling compared with the value of the services rendered by it not only in guarding our extended sea-coasts, bays and rivershores, but also in the magnificent results obtained in battle. Few guns have been surrendered or abandoned to the enemy; nearly all the losses have been by the inevitable accidents of battle, as in the case of the *Tecumseh* and *Commodore Jones*.

To the total on hand there should be added seven 10-inch solid-shot guns, intended for heavy work against iron plating, and three 13-inch Dahlgren guns, originally designed for the Monitor turrets, but superseded by the modifications made in the length and thickness, at muzzle, of the 15-inch guns, thereby adapting them to the use of a smaller port-hole.

There are also now in process of fabrication a new class of 32-pounders and 8-inch smooth-bore guns, for the broadsides of light vessels that are unable to carry and work efficiently the 9-inch shell guns. It is likewise in contemplation to provide for such vessels a new 8-inch solid-shot gun, to bear a heavy charge, in order to obtain greater penetration. The first gun of this kind has been cast, and will soon be subjected to regular experiment, the details of which are necessarily confined to the projection of a solid globe of hard iron or steel against a sample of any ordinary plating which can be used for the protection of vessels.

In the rifled ordnance adopted for naval purposes by the Bureau, no changes have been made, except in the introduction of one more caliber among the Parrott rifles, viz:—the 60-pounder. This, as an intermediate between the 30 and 100-pounder, has been found to be of great service as a chase gun, and fully supplies the place, in the armament of ships, contemplated by the 50-pounder of Rear-Admiral Dahlgren's system. It is generally used as a pivot gun, and, as its bore corresponds with that of the army smooth-bore 18-pounder, the round projectile of the latter is always available where high velocities are needed at close range.

COMPOSITION OF BATTERIES.

The governing rule in arming our ships of war, has been to place on board of them the very heaviest and most effective guns they can bear with safety. In general it may be stated that the 9-inch are used for broadside, the 10-inch and 11-inch, and the Parrott rifles in pivot, the 15-inch for the monitor turrets, and the bronze howitzers and rifles for boat and deck service inshore. A few of our ships continue to be armed with the 32-pounder and 8-inch guns of the old system; but these will probably give way to the modified guns of similar classes above alluded to. The battery of a "first rate" is represented by the *Minnesota*, carrying one 150-pounder rifled and one 11-inch smooth, in pivot; forty-two 9-inch smooth, four 100-pounders rifled and four howitzers, in broadside.

Of the Monitors, by the *Tonawanda*, carrying four 15-inch, the *Onondaga*, carrying two 15-inch, two 150-pounders; and *Montauk*, carrying one 15-inch, one 150-pounder.

The development of the power of each individual ship is:—

	In shot. lbs.	In shell. lbs.
1st Rate.....	2,606	2,123
2d Rate.....	1,220	990
3d Rate.....	424	343
4th Rate.....	210	183
and.....	294	255
In the Monitors:—		
Tonawanda.....	1,764	1,320
Onondaga.....	1,180	930
Montauk.....	606	465

These figures express the weight of metal thrown for breaching purposes by the guns at a single broadside in solid shot or shells. Conjoined with these, however, are the destructive and terrible agencies of grape, canister and shrapnel, available at all times in the general course of naval warfare, but most especially and signally so when used against uncovered masses of men. The effective power of a ship is therefore increased in a very great degree by these auxiliaries, which are common to both rifled and smooth bores, excepting grape, which is not used in the rifles.

These pivot guns are always placed near the ends in the vessel, and, therefore, do not interfere in the least with the working of the broadside. The rapidity of fire from them is of course not so great as from an individual gun of broadside, but is fully sufficient for the purpose of accuracy at ranges beyond the reach of the lesser calibers. No ship can, therefore, be considered properly armed that has not a pivot gun of greater power and range than the guns of broadside. But whether a battery consisting entirely of heavy pivot guns would be more formidable than one of broadside alone, the aggregate weights being equal, has not yet been tried, the only effort of the kind being that of the *Niagara*, which has a battery of twelve 150-pounder rifles mounted in pivot, and no regular broadside guns.

The decisive power of the heavy gun in pivot is, however, most strikingly exemplified in the recent fight between the *Kearsarge* and *Alabama*, although the distance at which the action was fought was fully within the scope of the broadside 32-pounders of either vessel, being only about 700 yards. The water also was smooth, and both ships moved steadily under steam in a continuous circle around a common center. Every condition was therefore most favorable for the full exercise of the offensive power of each class and description of gun used; but it does not appear from the official reports, or the published statements of the affair, that much damage was inflicted on either vessel by the guns of broadside, the decisive work having been performed only by the pivot guns of the *Kearsarge*. These were the two 11-inch guns mounted at either end of the ship, the light 30-pounder being too feeble to have had any bearing whatever upon the result.

We gather from the official report of Capt. Semmes of the *Alabama*, that the effect of the 11-inch shells of the *Kearsarge* was most disastrous. For he states that "after the lapse of about one hour and ten minutes our (his) ship was ascertained to be in a sinking condition, the enemy's shell having exploded in our sides and between decks, opening large apertures, through which the water rushed with great rapidity." This part of his report is most certainly true, if all the rest is questionable.

There can be no question with regard to the superiority of the 11-inch guns over the Blakely 120-pounder, and the 68-pounder of the English pivot system, either in penetration, smashing effect of the shot, or explosive power of the shells. For the *Alabama* was sunk in a little more than an hour after the *Kearsarge* began firing, and the English and French Navies were thus taught a lesson in practical gunnery and seamanship which they will not soon forget.

The result of this action may, therefore, be taken as proving, beyond doubt, the wisdom of arming our ships with a mixed battery of pivot and broadside guns, taking due care to place on board of each ship the heaviest and most powerful guns that she can safely carry, and manage with ease, in all weathers. This seems to have been fully and immediately understood by the officers of the French Navy at Cherbourg, who did not fail to avail themselves of the opportunity thus afforded them of studying the details of armament on board the *Kearsarge*, upon her return to that port after the battle. They are entirely welcome to the information thus obtained; the lesson is merely elementary, and by no means so instructive as the one since presented, for the world's investigation, on the waters of Mobile Bay.

THE FOUNDERIES.

It is no idle boast that the cannon of the United States navy, made exclusively from American irons, are unsurpassed by those of any other nation; and this will continue to be the case so long as the enterprise of our citizens is left untrammeled, and full opportunities are afforded for the exercise of their skill in this most important art. The work has been steadily prosecuted during the past year, and will be continued by the founderies as fast as the demand for the smooth-bores increases.

The cast-iron banded rifles of Mr. Parrott, made at the West Point Foundery, are still the only kind used in the navy, except the bronze 12-pounders and 20-pounders of Rear-Admiral Dahlgren. Since November of last year there have been added to the stock of these rifles on hand at the depots and in service 385 of the different calibers, including twenty new 60-pounders, making a total at present available of 1,005 guns, after deducting twenty-three lost or disabled by the accidents of battle. Of these thus lost or disabled, six gave way at the breech, four were broken by the explosion of shells near the muzzle, three were cracked in the body, two were condemned for excessive enlargement of vent, seven were lost by wreck, and three captured by the rebels. The percentage of loss by rupture and enlargement is therefore very small.

EXCELLENCE OF THE PARROTT GUN.

It may be remarked that no rifled gun has yet been devised which can be considered perfect; and the Bureau has sought in vain among the systems of European nations and the improvements of our own country for a better gun, taken as a whole, than the Parrott rifle. Its lifetime, as fixed by the inventor, is 750 rounds; but the navy guns have in many instances shown a greater endurance.

It is true that reports are occasionally received of failures with the Parrott projectiles (also prepared at the West Point Foundery), but these are again counterbalanced by the most favorable reports; and it is certain that whenever a close attention is paid to details in loading and firing, these guns may be relied upon for range and accuracy. But if these details, from any cause, are not sufficiently attended to, the firing of no rifled gun can be considered safe or certain. At all events, whatever may be the defects of the Parrott system of rifled ordnance, no other has yet been produced which commends itself so strongly to the service; and until another and a better one is devised and subjected to the same ordeal, the Bureau will continue to place its guns in the batteries of ships as important auxiliaries to the smooth-bore pivots.

The rule of the navy is to pay particular attention to the wear of the bores and vents, and to the manner of loading, especially in batteries established on shore.

WROUGHT-IRON GUNS.

Propositions have been made to supersede cast-iron for rifles (and in fact for smooth bores also) by

wrought-iron; and a heavy wrought-iron rifled gun of 7-inch bore, forged in a peculiar manner, by Mr. Horatio Ames, of Connecticut, is even now under process of trial, as well as one (of smooth bore) designed and constructed by our distinguished citizen, Mr. John Ericsson. But the experiments have not been sufficiently advanced with either of these guns to form a reliable judgment as to the probable result; for there are many grave questions involved besides the ability to resist rupture; and these will inevitably be developed under the strain of excessive charges.

PARROTT GUNS TO BE CAST ON RODMAN'S PLAN.

It may be remarked that Mr. Parrott has recently determined to manufacture his heavy rifles on the Rodman plan, being convinced that he thereby obtains a gun of greater uniform strength and density, with a surface of bore better suited to resist the action of the rifled projectiles.

It would no doubt be interesting to describe fully the process of founding cannon by both methods; but the limits of a general official report on various other subjects rendered this inexpedient. It is sufficient to know, however, that they are each perfectly understood by the men engaged in the business; and since the casting of the enormous 20-inch cannon at Fort Pitt Foundry for the Army and Navy, there really would seem to be no limit to the ambition and daring of our artisans. These huge masses of iron were cast without the slightest difficulty, the time elapsing from the moment of tapping the furnaces to the complete filling of the mold of the army gun, being only twenty-two minutes. To produce this casting, no less than one hundred and five tuns of iron were melted!

American Trade in China.

The Shanghae correspondent of the London *Times* gives some highly interesting details of the rapidly increasing value of the trade with China, consequent upon the opening up to commerce of some of the great interior rivers. Not the least interesting among them, nor the least astonishing in the result it discloses, is that relating to Hankow, which was visited for the first time by Lord Elgin only six years since. The total value of the trade at this river-line port the past year, was between seven and eight millions sterling, or between thirty-five and forty millions of dollars. This large traffic employs a number of vessels, principally steamers, in carriage, and on this point, says the correspondent, American enterprise outstrips British, as the number of ships plying on the river which fly the stars and stripes is nearly double those which boast the union jack. The total inward tunnage of every description entered at the port of Hankow during the past year was 191,126 tuns, and of outward ships 204,185. Of this, in the aggregate 103,000 was British, 270,000 American and 3,517 (!) French. Out of this latter total 2,367 tuns were represented by native junks sailing under French protection, leaving 1,150 tuns represented by seven small lorchas, purely French.

Agricultural Crops of the Country.

The Bimonthly Report of the Agricultural Department for September and October, 1864, gives the following estimates of the crops in twenty-one of the loyal States and Nebraska Territory, for the years 1862, 1863, 1864. The quantities are given in bushels, with the exception of tobacco, which is in pounds, and hay, which is in tuns:—

	1862.	1863.	1864.
Wheat	181,188,089	179,404,036	160,695,823
Rye	21,239,451	20,782,782	19,872,975
Barley	12,488,022	11,467,155	10,716,328
Oats	171,463,405	173,800,575	176,690,064
Corn	586,226,305	451,967,959	530,581,403
Tobacco	136,751,746	267,267,920	197,468,229
Buckwheat	18,708,145	15,806,455	18,700,540
Potatoes	113,234,644	100,158,670	96,256,888
Hay	20,257,968	19,736,847	18,116,751

Straw Protection for Bee-hives.

Take a few bundles of straw, open, sprinkle, and turn them. When so moist that they will not break in handling, grasp a handful by the buts and draw it out; take the heads in the other hand, and drop the buts; a little shake will separate all the short and broken straws, leaving only straight and long ones in the handful. Proceed in this way until you have a good bundle of long straw. Put a tight band about it very close to the heads. Twist some yards of rope from the broken straw. Now open the bundle and put it over the hive, spreading it evenly on all sides, and passing the rope tightly twice or thrice about it just above the fly hole. Then, with a knife or shears trim off the straws in a neat arc close around the hole, which should be so closed that only one or two bees can pass at a time. Ventilation ought to be provided before the straw is put on, and this is easily done in hives where the honey boxes are on the top, by taking them out and either leaving the holes open, or better, laying a bit of wire gauze over the holes. Thus protected, only very weak stocks fail to winter well, and such you cannot depend upon either to live or die.—*American Agriculturist.*

Trades Unions and Strikes.

Miss Martineau, in her valuable "History of the Peace," has, in the introduction to the American edition lately issued by Walker, Wise & Co., given her judgment on Trades' Unions. As Miss Martineau is one of the promifient liberals of England, and has all her life been known as an earnest and intelligent friend of the working classes, her opinions are entitled to great weight. It will be seen, in the following extract, that the point she makes is the tyranny exercised over workmen by a few of their fellow workmen. She does not object to the right of each man to refuse to work unless he is paid the wages which he conceives his work to be worth, but to his right to compel others to adopt his own standard of wages. The passage, coming from such a source, is worthy the attention of all laborers, no matter what their occupation:—

"The ground of fear is that popular liberty is overborne by the Trades' Unions of our days. It seems to be so in every country where such combinations can take place; and the anxious questions are the same in all cases; the questions how to protect the liberties of individual workers against the dictation and tyranny of leaders and pretenders of their own class; and what are the chances of the class becoming informed and enlightened in regard to their legal and constitutional liberties in time to check the spirit of despotism in the few, and animate that of peaceful resistance to oppression in the many. At present, the Trades' Unions of the United Kingdom are its greatest apparent danger. They are an *Imperium in Imperio*, in which insufferable tyranny is exercised by working men over their fellows, from which there seems to be no escape but by the gradual process of education. The laws provide protection and remedy; but recourse to that protection is prevented by the same oppression. It is remarkable that the one intolerable despotism which at this day exists in England is found, not in the Government, not in the land-owners, not in the old-fashioned rural districts, but in the modern Democratic towns,—the despotism of working-men over fellow-workers in their own class and their own trade."

Extraordinary Discoveries of Petroleum in California.

"The occurrence of fluid inflammable substances upon the coast of Santa Barbara, in Southern California, has been known since 1792; but little importance has been attached to it until very recently, when the development of the oil region of Pennsylvania has shown the immense value of the great natural repositories of petroleum, and directed attention to other localities in which it is found. One of the most extraordinary of these repositories is that near the coast of California, about three hundred and twenty miles south from San Francisco, where the usual indications of petroleum were so great that parties, on learning the fact, at once proceeded to make explorations.

"The importance of these indications of a great petroleum region was not appreciated by the early explorers and settlers in California from the Atlantic States; and none suspected that the oil of this district was destined to add another product to the resources of the State, unequaled, perhaps, in value even by that of her wonderful mines of the precious metals. Even the indications of the vast quantities of petroleum on the surface have been regarded by the owners of the estates as a detriment to their property, inasmuch as they caused a loss of their live stock, in which the value of their ranches chiefly consisted, by the animals becoming drowned in the great pools of petroleum. These exudations have the effect to render barren tracts of land of a mile square, more or less, in the midst of a fine agricultural district.

"The first attempt to apply this petroleum to useful purposes was made about two years since by Mr. Gilbert, who, understanding its nature, and finding it in abundance issuing from many springs upon the property, put up for himself a refinery upon a small scale. He drew the crude oil chiefly from one of the great wells, from which he obtained 400 barrels, without apparently diminishing the supply. In the summer of 1864 Prof. Silliman examined this locality, and in a letter, dated at Buenaventura, Santa Barbara County, July 2, 1864, he writes:—

"'The property covers an area of 18,000 acres in one body, on which are at present at least twenty natural oil wells, some of them of the largest size. The oil is struggling to the surface at every available point, and is running away down the rivers for miles and miles. Artesian wells will be fruitful along a double line of thirteen miles, say, for at least twenty-five miles in linear extent. The ranch is an old Spanish grant, of four leagues of land, lately confirmed, and of perfect title, it has, as I said, about 18,000 acres in it of the finest land, watered by four rivers, and measuring in a right line in all near thirteen miles. As a ranch it is a splendid estate, but its value is its almost fabulous wealth in the best of oil.'"

The Cotton Supply Restored.

In the circular issued to the cotton dealers of England by Messrs. Neil Brothers is this paragraph:—

Cotton trade writers generally still industriously keep up the notion that the course of prices of this staple depends upon American politics and the state of the money market, studiously ignoring the fact demonstrated by the figures given below that, owing to the increased supplies from all quarters on the one hand, and the permanent decline of demand from economizing of material and substitution of other fibers for clothing on the other hand, our supplies of cotton, independently of America, are now in excess of the requirements.

They also give the following table:—

Supplies of cotton to the United Kingdom from other countries than the United States, but including latterly small receipts of American cotton from Matamoras and through the blockade:—

	Bales.
1858	577,000
1859	744,000
1860	784,000
1861	1,194,000
1862	1,445,000
1863	1,932,000
1864	2,600,000
1865 (estimated)	3,500,000

	Stocks of Cotton Dec. 2. 1863 Bales.	1864 Bales.
At Liverpool	249,509	383,800
At London	43,500	117,700
At Havre	26,200	61,800
Total	319,200	563,300
		319,200
Increase of stock in 12 months		244,100

Petroleum for Raising Steam.

An elementary course of experiments was commenced last week in the factory department of Woolwich dockyard, with a view of testing the capacity of petroleum to supersede coal and other fuel on shipboard, and also in propelling steam machinery in the factories. The method adopted is the patented invention of Mr. C. J. Richardson, an engineer residing at Kensington. The plan under trial is simply to burn the petroleum through a porous material, which is placed in an iron chamber, dipped into a water vessel also of iron. The oil admitted into the chamber soddens the porous material, and rises by a sort of capillary attraction. The surface then catches fire and burns rapidly, as long as the oil is supplied. The effect of the flame is so great that with the small apparatus, which is only two feet superficial area, and affixed to a boiler, the oil on Saturday was utilised so as to be equal for steam purposes to five tons of coals. A third advantage is obtained by the employment of the petroleum—namely, that no stokers are needed, and the boilers can be supplied with several fires one above another. The small grate used in the experiments was placed under a boiler of 17-horse power, and in two hours it raised the steam to 10lb. pressure. The only objection seems to be the fear of explosive qualities, but these Mr. Richardson states he is prepared to guard against effectually.—*Mechanics' Magazine.*

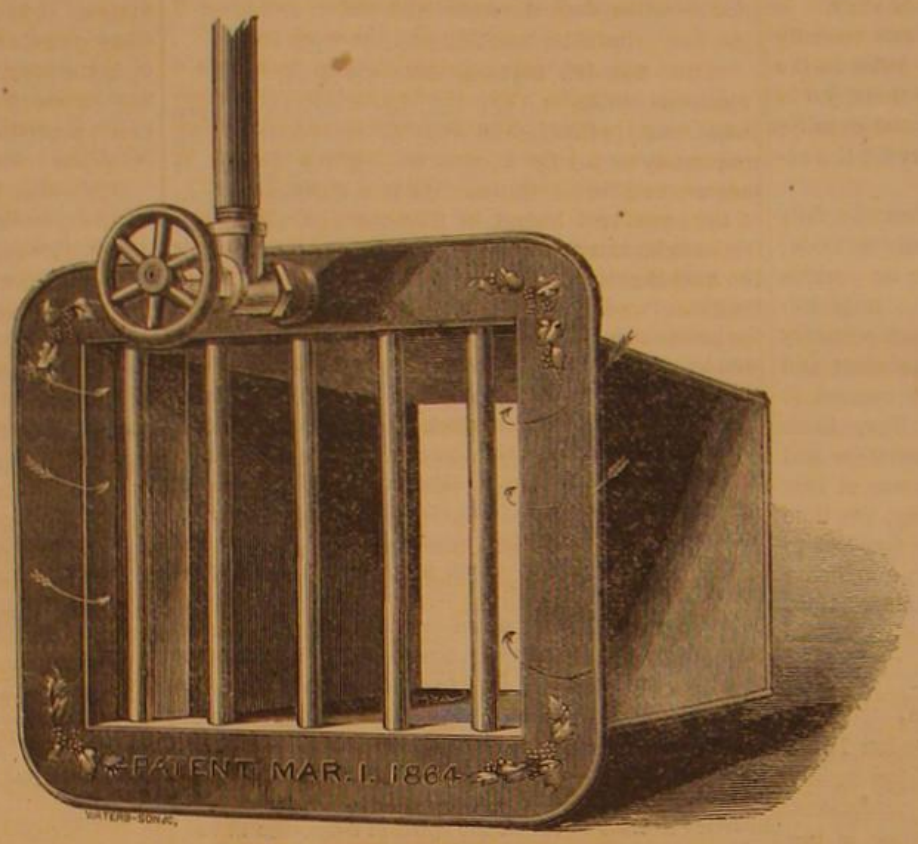
HOW TO GET A FARM AND WHERE TO FIND ONE.—This is a small octavo volume of 345 pages, by the author of "Ten Acres Enough," and is published by James Miller, 522 Broadway, New York. It gives the leading facts in regard to the several districts open for settlement in this country, including New Jersey, Maryland, and Delaware, the barrens of Long Island, and the western States. It has the text in full of the Homestead Law, which was signed by President Lincoln on the 20th of May, 1862. This law gives 160 acres of the public lands to any family who will settle upon the tract. The book is well printed and neatly bound in paper.

A LOCOMOTIVE with steam up was left standing on a turn-table at Newport a few nights ago, when, by some accident the machinery was set in motion, and the engine tore off swiftly into a neighboring field whence it took four hours of hard labor to extricate it.

Improved Steam Blower.

This is a very simple and compact machine for aiding the combustion of fuel in steam boilers. By its use the fire is at all times maintained bright and clear, and the fullest advantage obtained from the coal introduced. An ordinary fan blower cannot be adjusted so as to work fast or slow without great attention. There are times when a moderate draught only is required, while at others the full power is needed; but the fan blower must run alike at all times, thus causing a double waste of the power which drives it, and the heat driven off by it. The action of this blower is mechanical, and it is stated that a saving in fuel is effected by the combustion of the oxygen in the steam, which is set free by passing through the red-hot coals and grates.

The construction of the blower is simple, being merely an oblong case fitted with a front to which is connected a steam pipe. This front supplies steam to the upright tubes which are perforated in the side next the furnace with minute holes from which the steam issues when the valve is opened. These steam jets create a vacuum in the casing and under the grate, which causes the air to rush in rapidly, as shown by the arrows. A draught is thus created and the desired result obtained. The ease with which this blower can be controlled is a valuable feature; it is entirely noiseless, requires no belts or shafting, and is always ready for use. Large numbers of them are now in use. An advertisement can be found on another page. For further information address F. W. Bacon & Co., 84 John street, New York. The invention was patented on the 1st of March, 1864.



HANCOCK'S STEAM BLOWER.

Improved Skate.

Tripping it on the "light fantastic toe" may be a very agreeable thing for dancers, but the skater wishes to feel that his light fantastic toes are well shod and securely, with the best instruments for his purpose the market affords. The merits and demerits of skates, with or without straps, is a question which will always have strong supporters on both sides. The inventor of this skate, instead of trying to please one side, conciliates each, for they are made in both styles and can be quickly put on and off.

The essential points required of a skate are, that it shall be light, strong, durable and free from liability to derangement. Simplicity in the fastening is also of paramount importance, and to secure a general sale it must be made at a low price.

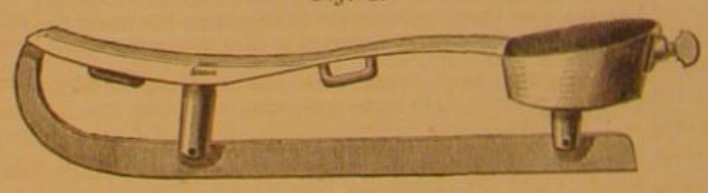
We think this skate possesses the qualities set forth. It is both light and strong, can be attached with or without straps, and has a solid box where the screw is, so that the heel is held as tight as in a vise.

By the depression of the heel below the sole of the skate the foot is brought on a level, so that the body is erect and without the tendency to pitch forward generally experienced where the heel is higher than the sole. In the first figure there is a side clamp shown where the straps usually are. All that is necessary to attach this skate is to slip the boot in it, as in a shoe, when the clamps adjust themselves. The other skate is worn with one strap in place of the clamp. Both are efficient and durable. We have tried them and found them in all respects equal to the inventor's claims. The skate was patented through the Scientific American Patent Agency on the 16th of June, 1863, by J. J. McCormick, of West Meriden, Conn. For further information address Clark, Wilson & Co., agents, No, 81 Beekman street, New York.

Fig. 1.



Fig. 2.



M'CORMICK'S SKATE.

Fifty thousand three-cent pieces were recently found in an old boiler in a cellar in Lockport, N. Y.

Molds for Casting Metal.

Mr. H. Cochrane, of the Ormesby Ironworks, England, has patented an invention, which has for its object the formation of permanent molds for casting iron and other metals, that shall not act injuriously on the casting by chilling the surfaces of the same, or by engendering gases. For this purpose he makes such molds of a composition consisting of fire-clay mixed with black-lead or plumbago, or of fire-clay mixed with black-lead and silicon, or of black-lead mixed with silicon; the composition which he has found suitable for the purpose being one-third of black-lead mixed with two-thirds of fire-clay, with a small proportion of silicon, but he in no way limits himself to these proportions. The molds, when made, are, by preference, dried gradually by a moderate heat.

New Magnetic Needle.

Dr. Joule exhibited, at a recent meeting of the Manchester Philosophical Society, a magnetic needle for showing rapid and minute alterations of declination. It consisted of a piece of hardened and polished watch spring, an inch long and one-tenth of an inch broad, suspended vertically by a filament of silk. The steel was magnetised in the direction of its breadth. He remarked that Professor Thomson had long insisted upon the advantages which would attend the use of very small bars in most magnetical investigations, and had employed excessively minute needles in his galvanometers with great success. Dr. Joule stated his intention to fit up his needle so as to be observed by light reflected from its polished surface, or otherwise, by viewing a glass pointer, attached to the bottom of the steel, through a microscope. He believed that by the latter plan he should be able to observe deflections as small as 1 second of arc.

Large Emery Bed Found.

Dr. Charles T. Jackson, of Boston, recently read a paper before the Boston Society of Natural History, in which he announced a discovery which will be of incalculable importance, not only to Massachusetts, but to the country. It is no less than the discovery of a mine of emery. To manufacturers and to scientific men the importance of this discovery is at once apparent.

He said it afforded him great pleasure to announce the discovery of an inexhaustible locality of excellent emery in the central part of the State of Massachusetts, in the town of Chester, Hampden county, within three-quarters of a mile of the Western railroad, and 27 miles from the Springfield armories and workshops. For more than two years the existence of important beds of iron ore had been known in the mountains of Chester, and Dr. S. H. Lucas, who originally discovered and secured them, sought the aid of Boston capital in mining and smelting the ore.

On the 11th of October last Dr. Jackson revisited Chester, and was surprised to find that one of the beds, which all had supposed to be magnetic iron ore, and from which hundreds of tuns had been taken and smelted with the ores of iron found in Berkshire county, was really composed chiefly of pure emery—one part of the bed being properly iron ore. Had not the occurrence of Margarite and Chlorotoid called his attention to the probable existence of emery at this locality, it would have been overlooked to this day, and no one knows how much longer.

The principal bed of emery on the South Mountain, in Chester, is from four to ten feet in width, and is now quarried at the base of the hill. Its course is nearly N. 20 deg. E., S. 20 deg. W., and its angle of dip is 70 deg., and to the eastward, The bed widens rapidly as it rises in the mountain, and in one place where it is associated with a bed of iron ore, 17 feet wide, the emery itself not being less than ten feet in the clear. The highest point where it crops out is 650 feet above the immediate base of the mountain, and the bed goes through both the North and the South Mountains, and has been traced in length four miles. The depth to which it penetrates below the lowest point seen must be very great, so that we may say, without exaggeration, that it is really inexhaustible.

Dr. Jackson next mentioned several interesting scientific facts as to the condition in which the emery was found and the means necessary to be taken in breaking it up by fire, it having been found while quarrying it for iron, that many drills were broken and rapidly used up on account of the hardness. On the North Mountain, which is separated from the South Mountain by a branch of Westfield river, there are found three large beds of rich magnetic iron ore, six feet wide. Dr. Jackson mentions as a singular fact, that although one of the hardest minerals known, it has been smoothed and polished by the agency of drift grinding. The principal bed of emery on this mountain is seven feet in thickness. It is probable that all three of these beds of iron ore will be found on the South Mountain, for they run directly towards it, and it is not far distant.

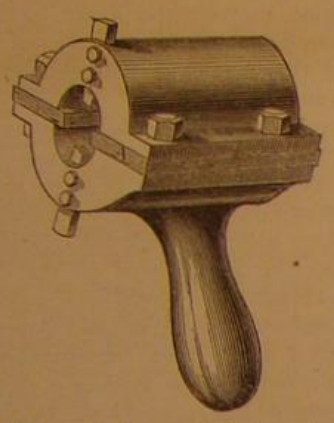
Practical trials of the Chester emery by skilled workmen, have proved that it is fully equal to the best London prepared emery from Naxos, and in one of the fairest trials it was found to exceed that emery in the work it performed in grinding hardened sword-blades, in the ratio of 20 to 15. The Chester emery, after grinding twenty swords, was far from being used up, while never more than fifteen had been ground by the wheels armed with the London emery. This experiment was made by Mr. Ames, of Chicopee, Mass.

TURNING TOOLS.

PART THIRD.

A great aid in turning long and heavy shafts and piston rods or shafting for pulleys, is found in what is called a "doctor." This tool is made in many different forms, but the essential principle of it is the same in every case. The object is to confine a number of cutters so that they cannot relax or slide away from the cut; for it will be apparent that should this occur the size would vary. The only change, therefore, in the size of the shaft will be from the wear of the cutting edges; where these are well got up, hardened and set, the loss from such a cause is inappreciable, unless the work be full of sand seams. One kind of a doctor is made in the following manner:—

Fig. 16.



The outside casting is made in two pieces and has a handle on one side. The wooden blocks, A, are placed between the two castings and screwed up tight. The distance between them should be just the size the shaft is when finished, and they serve to steady the tool so that the cutters will not chatter and make the work rough. The cutters are a little ahead of these blocks so that the wood bears only on the turned part of the work. To accomplish this the end of the shaft to be turned must be started with a common finishing tool for a short distance, so that the blocks can be fitted to their places before the doctor is set to work. The cutters are ordinary finishing tools ground square on their ends, and set so as to cut from their outside edges. The whole square face must not bear on the shaft or the tool will jump in. Very many mechanics round off the cutting corner of the tool, but this we think objectionable, for it takes more time to grind it, the tool has a greater surface to cut over, and the edge is more difficult to keep in good order than when square, or a very little rounded. The cutters themselves rest in slots, which they should fit accurately sideways; backing them up with bits of tin or wedges is a slovenly practice, and takes more time than it does to plane the cutters so that they fit properly at the outset; they may be kept in place by set screws or clamps bolted over the end of the casting, and a tap with a hammer on the end will set the tool into the shaft for its cut.

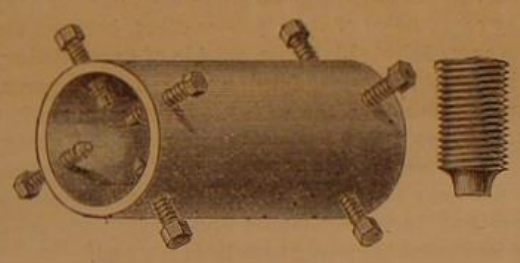
In free, soft, well-forged wrought iron, a doctor is a capital tool, but in scrap iron, in shafts that are full of sand seams and hard spots, it is difficult to make it work well. The sand takes the edge off the cutters and they have to be ground frequently. It is then a difficult matter to set them on the old cut, so that the shaft will be neither smaller nor larger than the part previously turned, nor yet have a shoulder or ridge where the cut was started anew.

Shafting for pulleys at the present day is all turned true and smooth. It used to be the practice to bore the pulleys a sixteenth of an inch larger than the shaft, or an eighth, for that matter, and put set screws in the hub so as to fasten the wheel in place. This way of doing work has been abolished. With such a plan the pulley never runs true. The belt is at one time slack and at another tight, so that the machine driven runs by jerks, instead of easily and smoothly. Grease and dirt also collect on the rough shaft, so that in time the upper part of a factory so fitted looks more like a hen roost than the scene of organized labor.

It has always been a favorite idea with us to turn shafting in a lathe as broom handles are turned—that is, in concentric cutters. There is no reason why such a plan should not work with short lengths and small sides. In such a lathe there would be no tail stock or back center, and the shaft, being carried in proper bearings, could be fed through the stationary cutters, just as a broom handle is turned in its lathe. The cutters might be set in a large box in the center of the bed, and the cone pulleys on the lathe spindle, together with the head itself, should slide along, or the shaft might be fed through them. In brief, the shaft might be turned at the last cut just as a boring bar runs in its box. Let the cutters be in the box, and feed the shaft through; with water run upon it the finish would be beautiful and the work true.

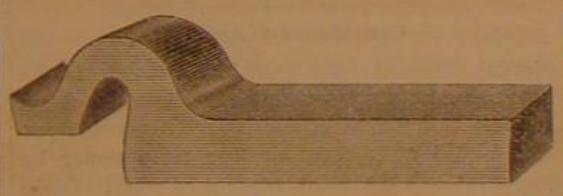
It may not be inappropriate to introduce here a fixture of the lathe which is often used in connection with long shafting. The common steady rest which accompanies a lathe is useless unless a bearing be turned for it to work on. With a shaft 18 feet in length and two inches in diameter, this is a very troublesome and uncertain process, for the shaft is so long that it buckles and springs, and rides up on the tool, and often jumps out of the centers. It is to avert such a disaster that this fixture was contrived. It is a very old and very useful servant of the machinist, and is merely a cast-iron sleeve with steel set screws in it. This sleeve is turned true in the center so that it runs in the common rest, and is slipped over the shaft and secured by the screws. The turned part is then set to run true—it makes no difference whether the shaft sags or not—and the steady rest applied. This is a short and simple operation and an extremely necessary one. This is the sleeve spoken of:—

Fig. 17.



There is another tool much used by some turners, which is called a spring tool, although its virtues are not apparent to us except for special purposes. It is made as shown below, in Fig. 18, and it never "digs in," but goes about its work soberly and steadily:—

Fig. 18.



From its shape it will be seen that whenever an undue pressure is exerted on the cutting edge the same will give and recede, or spring down, which is the same, and thus prevent the edge from jumping in. For long shafts or in places where the tool has to be extended a good ways from the post, this will be found useful for finishing with, for it will not chatter if the surface in contact with the job, and the amount of cut, be small. We consider it of doubtful utility for finishing surfaces that require to be true, for every inequality that the edge comes to, if the spring part be strong enough, it cuts off, but if it be weak, it slips over and thus makes bad work. By putting a small wedge between the spring and the shank it can be at any time changed to a solid tool.

M. Poucel, chief engineer of the Mœrris steamer, belonging to the Messageries Imperiales, informs the Semaphore of Marseilles that, one evening during the steamer's voyage from Alexandria, a strong shock was felt by all on board, and a most unusual agitation was noticed in the water near the screw. The engines having been stopped and a boat lowered, it was found that a whale had got entangled with the screw, which had inflicted a deep and mortal wound just behind the head. With some difficulty the dead monster was extricated and hoisted on deck, when it was found to measure 21 ft. 4 in. in length, with a maximum girth of 13 ft. 9 in.

POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

The Association held its regular weekly meeting at its room at the Cooper Institute, on Thursday evening Dec. 29, 1864, the President, S. D. Tillman, Esq. in the chair.

After the transaction of some miscellaneous business, the President called on Dr. Parmelee to open the regular subject of the evening,

THE MANUFACTURE OF BISULPHIDE OF CARBON.

Dr. Parmelee stated that about $50,000 worth of bisulphide of carbon is used annually in the United States. It is a powerful solvent of india-rubber and other gums, and, being very volatile, is easily removed from the solution. It is remarkably transparent, and has extraordinary powers of refracting light; these two properties have recommended its use for lenses in optical instruments.

It is a chemical compound of carbon and sulphur, in the proportion of two equivalents of sulphur to one of carbon, C S_2, which is in the proportion of 6 pounds of carbon to 32 of sulphur; the atomic weight of carbon being 6 and of sulphur 16. To effect the combination it is only necessary to bring the two elements in contact at a bright red heat, the atmospheric air and other matters being excluded. Charcoal is heated in a close vessel, and brimstone in small lumps is dropped in upon it. The sulphur is evaporated, and as the vapor comes in contact with the incandescent coal, chemical combination takes place in the proportion stated.

As the bisulphide of carbon boils at 110°, it is, of course, in the state of vapor in the heated vessel where it is formed, but it is reduced to the liquid state by cooling it to its boiling point. When first formed it is mingled with the vapor of sulphur and with sulphuretted hydrogen, but may be purified from these.

The speaker then made drawings on the blackboard of the apparatus which he had employed on a large scale in manufacturing the bisulphide of carbon, but these could be reproduced only by elaborate engravings.

MANUFACTURE OF CHLOROFORM.

The President gave a short description of the mode of making chloroform, and stated that he was pleased to learn that the first that was ever produced in the world was made in this country, thus completing our claim to the discovery of anæsthesia—the greatest discovery in medicine that has ever been made. It is admitted that nitrous oxide and ether were first employed in this country as anæsthetics, but as Dr. Simpson, of Edinburgh, substituted chloroform for ether in 1847, the English and Scotch lay claim to the discovery. But Samuel Guthrie, of Sacket's Harbor, in this state, discovered chloroform in 1831. Professor Ives, of New Haven, first administered it by inhalation in January 1832.

It is a compound of carbon, hydrogen, and chlorine in the proportion C_2 A Cl_3. Guthrie obtained it by distilling a mixture of alcohol and chloride of lime, and subsequently rectifying the product.

PUNCHED AND DRILLED HOLES IN PLATES.

From an interesting and able article on this subject in the *Mechanic's Magazine* we make some extracts.

Not the least important subject is the relative merit of punched and drilled holes. For years engineer have been content to regard the punched hole as being so far perfect, that any improvement upon it was practically impossible. Recently, however, we find that an idea has got abroad that the operation of the punch seriously injures the iron submitted to it. In the almost absolute dearth of experimental results, it is not easy, perhaps, to come to any conclusion upon the subject which can be worth much. The advocates of the drill state that by its use not only is the iron in no way injured, but that a better fit is secured for the rivets, and that the work can be performed so accurately that the use of the drift is altogether done away with. The advocates of the punch, on the other hand, state that the work can be done by it at a price varying from one-third to one-fifth that of the drill, and that practically a joint in every respect as sound and trustworthy can be secured by proper attention and skill. If it can be proved that the iron really does not suffer injury and loss of strength by being punched, then it is certain

that the drill has so far the best of it. In order to arrive at any decision on this point, it is necessary to comprehend the nature of the injury inflicted.

The first effect of the punch, if properly made, is to crush the fibers not only immediately under it, but for a minute distance round the hole. This action, however, apparently only takes place upon the upper side of the plate. Upon the lower side, with properly made dies, a ring of iron will be found surrounding the orifice which has simply undergone compression, because this ring has sustained the entire thrust of the punch during a certain portion of its descent; but yet its comparative area is so great that no true crushing can ordinarily take place. It would also seem that the lateral action of the button of iron forced out tends to condense and consolidate the metal in the immediate neighborhood of the hole. The fibres undoubtedly suffer some distortion as well, and with this it would seem that the internal changes in the iron must begin and end.

When rivets are made rather long, and carefully set up so that the holes are well filled, in the common acceptation of the word, they exert a direct splitting action upon the plate. Joints cut transversely through such rivets show that they are in such aboslute contact with the iron by which they are surrounded that it is not easy to say which is the plate and which the rivet. There are thus, we see, many operating causes at work tending to reduce the strength of the joints which have nothing to do with the punch, and we are disposed to regard them as being quite sufficient to account for the loss of four per cent of the true strength of the plate, if not much more. Brunel's experiments, conducted some years ago, tend to confirm this opinion. He employed plates of the best Staffordshire iron, .5 of an inch thick and twenty inches long, butt-jointed, and secured together by a fish-plate at each side .375 of an inch thick, and ten 11-16th rivets in each plate. The first gave way with 153 tons, the rivets being shorn through. In a second experiment, in all points the same, the plate was ruptured with 164 tons. There can be no doubt that the difference was here determined by some variation in the quality of the rivets effected by the method of manipulation, or the quality of the workmanship. The sectional area of the rivets was 3.75 square inches, and as they were in double shear, we must take 7.5 as their practical shearing area. The area of the fractured section of the plate was 8.25 inches, and thus the rivet area was about nine per cent less than that of the other plate.

In the operation of punching, holes are invariably slightly countersunk, and there is little doubt that this countersink adds materially to the efficiency of the work when but two or three plates are to be joined. The contraction of a rivet in cooling exposes the head to very considerable strain—one so great, indeed, that it must militate seriously against the powers of the rivet. If there is a good countersink at each side, the heads of the rivets have little to do, and thus an element of safety is introduced. With the drill a countersink cannot be produced, except at a price which at once precludes its adoption, and in drilled holes, therefore, the rivet heads have to do all the work. When three or more plates have to be put together to make up a given thickness, as in bridge building, however, it is probable that the countersink operates injuriously, as a long rivet cannot be made to fill the holes. The system adopted in the construction of the great Charing-cross railway bridge may then be resorted to with advantage. All the holes were punched .5 of an inch too small. When the plates were put in place, a small traveling engine bored or reamed them up to the proper size, and the rivets or bolts were then driven home tight by a species of "dolly" extemporized for the purpose.

It is quite certain that, although good or even fair iron in the plate may be punched with impunity or positive advantage, bad angle-iron cannot be so dealt with, unless the punch, dies and presses are in the very best possible order, and of the very best construction. The best iron may be seriously injured by a dull punch, which wedges its way through the metal instead of stamping the bit out of it cleanly. Good apparatus is seldom to be found in establishments where bad iron is much used, and the probable result of the introduction of any cheap system of drilling would be that iron of the very worst and most rotton description would be worked up as it cannot be worked up now; while with good irons no advantage whatever would be derived from the use of the drill to the exclusion of the punch.

Correspondence

Seasoning of Timber and Lumber.

Messrs. Editors:—Mr. H. G. Bulkley's letter in your issue of the 2d inst., on the seasoning of lumber and timber is good and well timed, as all timber that is used for railway or building purposes should be thoroughly seasoned, both for its own preservation, and that no open joints should be caused by shrinkage, to make the work look and be bad, sometime after it is put together. In places where the timber is exposed, moreover, open joints allow water to get in, and so hasten its decay. The use of steam, however, for drying, is far from new. I have used, and seen it used, many years ago. By seasoning timber in the sun, the outside cracks and opens in seams, and warps before the inside is dried. Hot air has the same objection, but in a less degree. Steam heats the timber through as well as hot air, and by its own deposit of moisture on the exposed surfaces prevents them from cracking and opening into seams. Superheated steam, however, is unnecessary; for immediately on its introduction into the chamber containing the timber, it would be condensed into ordinary steam. The commonly used methods for preserving timber, such as creosoting, have in very many cases failed of their proper effect, because the substances injected into the outside of green timber, under great pressure, filled up the outside pores, thereby preventing the moisture inside from getting out, and thus rather hastened than prevented decay. This is the reason why timber prepared by creosoting has not been benefited; whereas, if the process by steam had been understood and adopted, the good that was expected would have been realized.

I am much pleased to see this question opened, and hope Mr. Bulkley will receive remuneration for his large outlay, in the shape of heavy consignments of timber, &c., to be prepared by him, as I presume, from his letter, that he is engaged in this kind of work.

Wm. Toshach.

54 William Street, New York, Dec. 29, 1864.

Compressed Air.

Messrs. Editors:—On page 275, Vol. XI., of the Scientific American, we find that steam conveyed 1,100 feet through pipes only lost five pounds per inch. Would compressed air lose more power by passing through the same amount of pipe? Could compressed air be used in the mines, with the same amount of steam to compress it, as steam is now used; or, what would be the loss by using compressed air for work in the mines?

J. H. T.,
Co. C, Second Colorado Cav.

Fort Riley, Kansas, Dec. 17, 1864.

[Compressed air has been used several years for driving machinery in one of the mines in Scotland. It is also employed to drive the drilling machines in the great Mont Cenis tunnel, and we have seen a number of sewing machines driven by it in this city. Whether air would be more efficient than steam in the case cited involves questions of heat and condensation which make the problem as complicated as that of expansion.—Eds.

Boring for Oil near Chicago.

Messrs. Editors:—As you were kind enough, in a recent number, to notice this work, I now have the pleasure of stating to you that we have struck the greatest flow of water of which there is any public record. This well is five inches in diameter and seven hundred and eight feet deep. On the morning of Thursday last the water came to the surface with the rush and roar of a great torrent. It is now discharging 400 gallons per minute, 24,000 per hour and 576,000 per day. The water is clear as crystal, perfectly sweet and pure, and remarkably free from taints of sulphur and other disagreeable substances. The well of Grenelle, in France, discharges half a million gallons per day, but the water is warm (85° Fah.) and can only be used for heating the hospitals and for mechanical purposes. This water can be used for any purpose and has power enough to carry it in pipes one hundred feet above the surface.

Geo. A. Shufeldt, Jr.

The American Cotton Spinner.

Messrs. Editors:—I notice in your issue of January 2, 1865, that a correspondent wishes to be informed what is the best work on the practical operation of cotton machinery. He says—"I have a work entitled the 'American Cotton Spinner,' but it does not explain the point I wish to understand, which is:—Suppose a man was about to start a mill, he wishes to produce cloth that shall weigh four, five or six yards to the pound, that will require a certain number of yarn according to the sley and pick of the goods. Now what weight of cotton shall be spread on a given space on the lapper apron, so that after it has passed through the different machines with whatever draught they may have, the result shall be the number of yarn required."

I would say that the "American Cotton Spinner," also "Scott's Cotton Spinner," gives the desired information. To be sure neither of these works gives it in so many words, but they give the basis of rules by which we are able to work it out. Books will not work or think for us, we must do that ourselves. With a little thought and study, and some practical knowledge, and with the aid of the "American Cotton Spinner," I think your correspondent will be able to work it out. Allow for waste about 15 per cent. If he should not succeed I will be glad to hear from him.

Otis B. Morse,
Mechanical Engineer.

Chicopee, Mass., Dec. 30, 1864.

[The "American Cotton Spinner" was published by Henry Carey Baird, 406 Walnut street, Philadelphia.—Eds.

NEW BOOKS AND PUBLICATIONS.

A Year in China. Published by Hurd & Houghton, New York. Price $2.

The author of this pleasing narrative is Mrs. H. Dwight Williams, wife of the United States Commissioner, stationed at Swatow, one of the five ports through which commerce from other countries is admitted into the Chinese Empire. The authoress had excellent facilities for gaining accurate knowledge of the life and manners of those curious people, and her style of narrative is clear, simple and agreeable. Considerable attention is bestowed upon the Chinese women, and much entertaining and instructive matter is given in regard to them. Mrs. Williams was a passenger, homeward bound, on the ship *Jacob Bell*, which fell into the hands of the pirate *Florida*, Capt. Maffit. An account of the capture and the scenes which followed are graphically set forth.

The Fire on the Hearth in Sleepy Hollow. A Christmas poem of the olden time, by Edward Hopper. Published by Hurd & Houghton, New York.

For a few years past we have devoted but few of our spare moments to the perusal of unpretending poetry, nevertheless, we often meet in the newspapers, with gems from unknown sources, and of beauty so rare as to awaken a strong desire to know the authors. About a year ago, some true mother indited a most touching "Christmas Eve," referring to a vacant stocking that one year before was filled for a dear one who since had died. It was a poem worthy of a Bryant, but the authoress is unknown. Mr. Hopper is to us a new candidate for poetic honors, but in his little volume are found many most exquisite productions, which will find a hearty welcome to the fireside. The book is inscribed to John Taylor Johnston, Esq., one of our well known citizens.

Trow's Daily Calender for 1865.—John F. Trow, No. 50 Greene street, New York, has just issued his yearly calendar, which is one of the most convenient things for the purpose that we have ever seen. Upon three hundred and sixty-five separate papers, corresponding to each day in the year, are printed the day and date and other useful matter. These papers are secured in a paper frame work, and one of them is to be removed daily to show the cor-

rect date. It is not only a good timekeeper, but it presents a summary of useful facts which are often quite valuable.

Our Young Folks.—Messrs. Ticknor & Fields, of Boston, the well-known publishers, have just commenced the publication of an illustrated magazine for boys and girls, bearing the above title. It is edited by J. T. Trowbridge, Gail Hamilton and Lucy Larcom, names which guarantee a sterling character for the new work. The first number now before us contains several spirited illustrations and articles well adapted to amuse and instruct the youth of our country. Published monthly at $2 per annum.

Pearls from Heine.—Published by Frederick Leypoldt, of Philadelphia. This is a beautifully embellished work embracing a few of Heinrich Heine's choice poems. For sale at Hurd & Houghton's, New York.

We are indebted to Wm. Faxon, Esq., Chief Clerk of the Navy Department, for a copy of the Report of the Secretary of the Navy and accompanying documents. It is a voluminous work of 750 pages.

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:—

Spur Carrier, Boot-drawer and Pantaloons Guard.—The object of this invention is to provide a means of instantly drawing off heavy boots, supporting a military spur so that it cannot fall, and to prevent pantaloons from getting under the heel and being trodden upon, all of which is accomplished perfectly. The illustration of it can be found on page 352, Vol. XI. of the Scientific American. Egbert P. Watson, of New York City, is the inventor.

Car Spring.—This invention consists of a spring composed of two arms each of which is supported at two or more points by blocks of india-rubber, or by springs of any other suitable material, in such a manner that one of said blocks or springs forms a yielding platform for each of the arms, and that by the combined action of all the springs considerable motion is allowed to the outer end of each arm which supports the car or other vehicle; the invention consists also in the application of toggle arms connecting the ends of the arms which are supported by springs in such a manner that a spring constructed according to this invention will readily adapt itself to a heavy or light load by changing the bearing point or points toward or from the center of the toggle arms; it consists finally, in the use of an adjusting screw in combination with one or more of the springs bearing on the arms, in such a manner that the power of the spring can be adjusted at pleasure. Andrew Buchanan, of Brooklyn, is the inventor.

Steam Engine.—This invention consists in an engine with two pistons which work in square cylinders, and are connected by a rigid bar carrying two studs, in combination with a lever secured to the end of an oscillating shaft on which is mounted a cog wheel or pinion gearing in toothed racks attached to or cast solid with the two slide valves, in such a manner that by the action of the studs striking the oscillating lever, the valves are changed at the proper intervals, and one cylinder takes steam while the other exhausts, and by these means a constant reciprocating motion is effected by the action of steam, hot air or water. Daniel Sexton, of San Gabriel, Cal., is the inventor.

Machine for Chopping Meat.—This invention consists in the employment or use of removable guides in combination with the cutter head in such a manner that by withdrawing said guides the cutter head can be turned upside down and the knives thereby cleaned and sharpened without removing them from the head and the operation of introducing the meat to be chopped and particularly that of removing the chopped meat from the machine is considerably facilitated; the invention consists further in making the block vertically adjustable and in steadying the same by a pin or shaft which runs from the center of the block and which has its bearings in a slatted bridge which straddles the gear or worm wheel, by means of which a rotary motion is imparted to the block; the invention consists, finally, in the use of an endless screw and worm wheel for the purpose of imparting a rotary motion to the block, thereby rendering the machine simpler than those of ordinary construction and reducing its cost. William G. Bell, of Boston, Mass., is the inventor.

Roller Gin.—This invention consists in making the the drawing, in roller of Roller Gins, partly elastic and partly solid, either by rubber rings placed straight or spirally around it, or by securing segments of rings thereon; the elastic and solid surfaces being afterwards covered by a suitable material of flexible character. J. F. Brown, of New London, Conn., is the inventor.

Stump Extractor.—This invention consists in the application to the machine of a lever and springs or elastic bars arranged in such a manner with pawls and a ratchet that the same means which is employed to extract a stump or raise a body, may be also used for gradually lowering it. The invention also consists in the employment or use of a brake arranged in connection with the ratchet and in such a manner that an elevated body may, by a simple application of power on the part of the attendant or operator, be held in suspension until it is necessary or convenient to remove it. Hiram Lemm, of St. Joseph Co., Mich., is the inventor.

Street Gas Lamp Posts.—The object of this invention is to provide a means for the exact measurement of the gas which is consumed in street or solitary lamps. The improvement consists in the combination of a gas measuring register or meter, either of the wet or dry kind, with the lamp-post, the meter being placed in the hollow base thereof. J. P. Hunt, of Manchester, Hillsborough Co., N, H., is the inventor.

Lubricators.—This invention relates to certain improvements in oil-cups or lubricators whereby the caps and shank are firmly and rigidly connected together by continuing said shank upwards in the form of a central spindle, admitting of the use of a detachable or independent reservoir of glass or other transparent material of any desired shape without danger of fracture by expansion or contraction, thus insuring the production, at small cost, of a superior article which combines the features of a transparent body and a graduating feed. John Broughton, 41 Center St., New York, is the inventor.

European Petroleum.

At the Wallachian Petroleum Company meeting, Dec. 6, an elaborate report on the petroleum districts in Wallachia, prepared by Prof. Chev. G. Capellini, was submitted, from which it appears that petroleum in Wallachia is found only in tertiary formations (which is not the case in America), associated with deposits of salt, sulphur, and gypsum. Prof. Capellini considers that in all the tertiary formations of the Carpathians petroleum is to be found, but the deposits by far the richest and most important refer to the Miocene period, the richness and abundance of which deposits depend, in inverse ratio, upon their relative antiquity. He regards as the most favorable localities for exploitation of petroleum those where the deposits belonging to the upper Miocene form the small valleys lying at right angles to the tributary streams of the Danube. These observations induce him to admit the existence of petroleum, or at least of strata simply bituminous, in many parts of Wallachia, where up to the present no researches have been made, and where even its existence is unsuspected. These positions may be explored later, and meanwhile they serve to show what a vast field for enterprise is afforded by the Wallachian petroleum, its magnitude being such as to preclude the possibility of the clashing of interests of the various companies now exploring it.

From the Professor's report it appears that unmistakable traces of petroleum have been found in several places on that company's property. At Lower Scortzeni there are several wells, some of which are productive, and might be rendered more so. A kind of wax, or condensed bitumen, is found near Scortzeni, in the alluvial formation, which he believes to have originated in previous petroleum sources. He thinks this wax is identical with ozokerite, already found in Moldavia, and well known to mineralogists. This wax does not exist on the company's territory, but an analysis might show that its working would be profitable. At Podeni Nou there are eight wells sunk, in nearly all of which water accompanies the petroleum, No. 6 being the only one richly productive. At Gura Draganassa some wells at the bottom of the valley give hopes. In his remarks on the most desirable means of conducting the works and rendering the enterprize as lucrative as possible, he recommends that during the bad season operations should be diminished, and works scarcely commenced should be suspended, proceeding with only those of immediate promise, and that only on the most economical principles. In the next place, instead of exporting crude petroleum, it would be exceedingly profitable to refine the same before it leaves the Principalities. Not only would this diminish the expense of freight, but also a great quantity could be sold in Greece, Italy, and elsewhere, and that at a price lower than is now current in those markets. This cannot fail, if on an extended scale, to enable successful competition with American produce throughout Europe.—*London Mining Journal.*

MISCELLANEOUS SUMMARY.

A "monster improvement" is nearly completed at Chicago by the Dock Company, who have planned a magnificent system of docks, embracing a water front of five miles, the whole connected by seven ship canals cut at right angles with the river. These canals are 100 feet wide, 12 feet deep, and average 1,760 feet in length. By the same plan a connection is made with a complete railway system. The capital of the company is $650,000.

Not New.—An English paper says that among the novel proposals of the day is one for the construction of a small battery in the cross-trees of men-of-war. The battery is to be made of strong iron-plating, to be very small,—just sufficiently large to work a small rifled gun, which can be hoisted in time of action, and with which it is thought the decks of the enemy could be swept.

[Nothing new. Howitzers in the tops were used with great effect by Farragut at the capture of the New Orleans forts—Eds.

The Philadelphia coal-dealers now deliver their coal in sabks. In Great Britain this method is compulsory, and much annoyance and dust is thereby saved to consumers and the public. The sacks are required to hold a certain quantity each, and the carman must carry them into the place of storage. The coal wagons are compelled likewise to carry a portable weighing machine, so that the purchaser can, by having one sack weighed and counting the rest, form a pretty correct estimate of the weight of coal actually delivered.

We read that the pork packing business at the West this year will be more important than ever, on account of the extraordinary prices that prevail. Probably 3,000,000 hogs will be packed, and at an average weight of 220 pounds each hog will be worth $26 40, and the whole of them $79,000,000. If the Wandering Jew, in his travels, ever came over to visit this continent, he will undoubtedly pass by Chicago and Cincinnati in disgust.

Dusters.—The time for picking chickens has come, and it may be suggested that very neat dusters can be made by taking the curved feathers from the neck and elsewhere, and fastening them neatly to the end of a tapering pen-holder, or other handle, and then adding a neat finish with a bit of morocco. By a little tasteful arrangement of the parts, these dusters are not only useful and ornamental in the house, but may be sold at the shops.

Scientific and Mechanical Works.—We are continually appealed to by correspondents to state where certain mechanical works can be purchased. We refer all our readers to Mr. H. C. Baird, of 406 Walnut street, Philadelphia, who has just issued a catalogue of new publications, embracing nearly every branch of science and handicraft.

The American Philosophical Society of Philadelphia have awarded the Magellanic prize to Pliny Earle Chase of that city, for the discovery of numerical relations between gravity and magnetism. The prize is a gold medal of the value of ten guineas sterling.

The white fish of our great lakes have attracted attention abroad, and it is proposed to introduce them into the lakes of Cumberland and Scotland, now almost valueless.

Improved Foot Warmer.

"Keep your feet warm and your brain cool," is the advice of a celebrated physician, and very sensible advice it is. Cold feet cause chills to crawl up the nether limbs, freezing the blood, and as Hamlet says, "making each particular hair to stand on end, like quills upon the fretful porcupine." With some cold feet are congenital, or born with them, while others acquire the delightful sensation by exposure, or wearing wet boots. Temporary make-shifts are often adopted as a cure for this affliction, and those who go sleigh riding find warm bricks agreeable, or bottles of hot water, but from these the caloric soon radiates so that they are as dead and frigid as an iceberg at the North Pole.

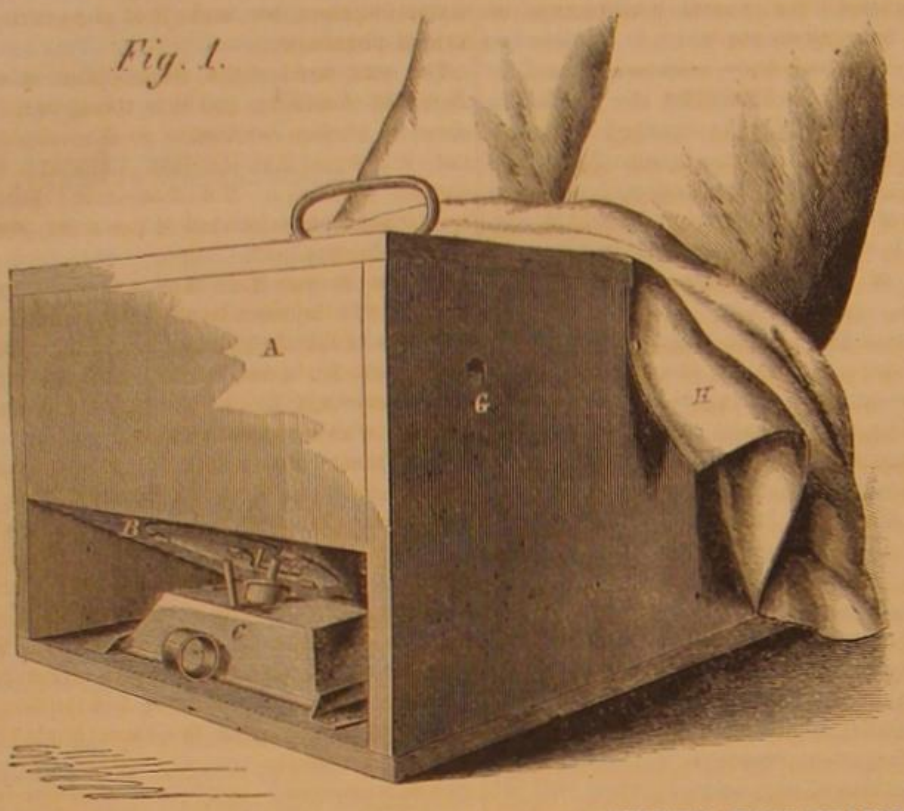
New Food.

Experiments in fattening beef cattle have recently been tried by Capt. Hoff, of the Soldier's Rest, at Alexandria, which demonstrate most clearly the superior qualities for such purposes of damaged hard bread and hay, mixed together, and subjected to a considerable pressure of steam, which effectually removes all mold and sourness. Beef is fattened in this manner more rapidly than by any other process, and the meat rendered exceeding tender and juicy. Thus a vast waste of bread and hay are obviated.

Effects of the Cash System.

The Mercantile Agency of R. G. Dun & Co., of this city, have published an annual review of the condition of the mercantile, manufacturing and trading interests of the country. They record but 510 failures in the Northern States during the past year, with liabilities amounting to $8,576,700. In 1861 there were 5,953 failures in the same States, with liabilities amounting to $178,632,170, and for the past eight years the average annual number of failures has been 2,832, and the liabilities $33,830,048.

Fig. 1.

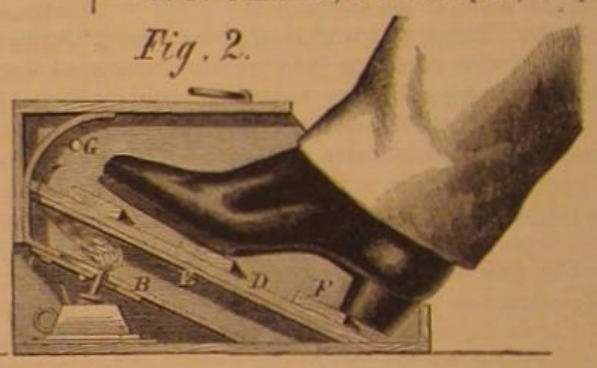


HUNT'S FOOT WARMER.

Hunt's foot warmer, here illustrated, is better than a hot brick, better than a bottle—(of hot water) and gives forth a perpetual warmth which is simply delightful.

The arrangement is simply a wooden case, A, with a partition in it, see fig. 2. This partition has a sliding cover which admits the tube of a spirit lamp, C, placed in the lower part of the box. Above the partition is an inclined foot-rest, D, which is faced with metal, E, on the lower side. The flame heats this metal and also warms the air contained between the foot-rest and partition, so that a genial atmosphere is the result. No matter what storms may rage outside it is always summer within. The cleats, F, on the foot-rest, prevent the boots from burning, and there is a small aperture, G, in the top which creates a draft and allows the heated gases and air to escape as fast as they are burned up by the lamp. This foot warmer is very convenient in size and the lamp holds alcohol enough to burn a long time. The apron, H, is thrown over the feet, to prevent the hot air from escaping. It is the subject of two patents dated respectively, Feb. 25th, 1862, and July 22d, 1862; both patented through the Scientific American Patent Agency. For further information address Solomon Hunt & Co., P. O. Box 90, or No. 30, W. 5th st. Cincinnati, Ohio. See advertisement on another page.

Fig. 2.



NOTICE TO SUBSCRIBERS.

Hereafter, until further notice, the price of the Scientific American will be as follows:—When sent by mail, $3 per annum; $1 50 for six months; $1 for four months, When delivered in the city by carriers, $4 per annum. Single copies at the publication office and at periodical stores, 8 cents each.—The postage on the paper by mail is 20 cents a year, payable quarterly in advance at the post office where received.

William Hartway, against whom an injunction was issued for infringing a patent, was recently sentenced in this city to thirty days imprisonment and a fine of one hundred dollars for disregarding the injunction.

DODGE'S ADJUSTABLE CASTER FOR SEWING MACHINES.

There are many cases where it is necessary to move sewing machines from one apartment to another, or from a dark corner to the light. As the machines are now made they have to be carried, or lifted bodily, which is very hard work for ladies, who have to perform this duty usually in the absence of the more sturdy sex. We have often remarked the necessity for some such attachment as the one here shown, and believe that it will meet with favor from those interested. If common casters are applied, the machines slide to and fro, or else rock on the narrow points of contact afforded by the rollers, and thus make action of the machine uneven and disagreeable.



By the application of these fixtures the casters can be made available for transporting the table to any part of the room, or the machine may be instantly let down on a firm, solid bearing so that no instability is experienced.

By simply turning the handle, A, down, the weight of the table is raised, and the casters thrown into action, and by turning it up again the table sets firmly upon its legs. The raising is effected by the cam, B, which bears on the pin seen in the slot, C; the pin is in the rod, D, which in turn is fastened to the legs, E, so that by moving the lever as described the table is set upon its legs or the casters, as the case may be. We learn from the inventor that this invention is to be applied shortly to some of Wheeler and Wilson's machines. It was patented May 17th, 1864, by W. C. Dodge, of Washington, D. C., whom address for further information.

SPECIAL NOTICES.

Hugh & James Sangster, of Buffalo, N. Y., have petitioned for the extension of a patent granted to them on June 10, 1851, for an improvement in lanterns.

Wm. P. Uhlinger, of Philadelphia, has petitioned for the extension of a patent granted to him on Oct. 8, 1861, for an improvement in "Designs," for school desks.

It is ordered that the said petitions be heard at the Patent Office, Washington, on Monday, Feb. 20, 1865.

All persons interested are required to appear and show cause why said petitions should not be granted. Persons opposing the extensions are required to file their testimony in writing at least twenty days before the final hearing.

Fine Photographs of Machinery.—Mr. George C. Rockwood, of 839 Broadway, has shown us some photographs of machinery which are unsurpassed for sharpness and clearness of outline. Photographs of this kind of work are difficult to take, for unless the lights are well managed, the bright work becomes a blotch, the parts run into each other, and the design and details are wholly unintelligible. These photographs are open to no such objections, and one in particular, of a locomotive, commanded our admiration by reason of its distinctness and harmony in tone.

Matches.—The heavy tax on friction matches is defeating its object. The *Portland Advertiser* says that matches are now imported into the United States from New Brunswick, and sold in packages suitable for the retail trade, without paying any tax under the internal revenue law. The duty for importation is very much less than the stamp duty upon friction matches of domestic manufacture. The consequence is that the imported matches are sold so low that manufacturers of matches in this country cannot compete in the market. Already, at least three manufacturers of matches have removed from Maine to New Brunswick, to carry on the business there.

An inventor of a hay-press in Maine has experimented with his machine in pressing pine shavings for kindling. They make very neat packages, and can be sawed into blocks like timber. About a hundred bushels of shavings can be put in the space of an ordinary hogshead, and when once pressed the spring is all taken from them.

THE

Scientific American.

MUNN & COMPANY, Editors & Proprietors.

PUBLISHED WEEKLY AT
O. 37 PARK ROW (PARK BUILDING), NEW YORK.

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

☞ "The American News Company," Agents, 121 Nassau street, New York.

☞ Messrs. Sampson Low, Son & Co., Booksellers, 47 Ludgate Hill, London, England, are the Agents to receive European subscriptions or advertisements for the SCIENTIFIC AMERICAN. Orders sent to them will be promptly attended to.

VOL. XII. NO. 3....[NEW SERIES.]....*Twentieth Year.*

NEW YORK, SATURDAY, JANUARY 14, 1865.

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STEAM ON COMMON ROADS.

Steam carriages on common roads have for many years been a favorite scheme with inventors. The idea is attractive to the mechanical mind, and it is no wonder that men of genius have been charmed with it. To roll over the highway, fast or slow at will, to travel from one end of the country to the other without fear of wearing out horse flesh, to be ready at all hours and seasons for the journey, to have the control of an almost illimitable force under one's hand, would certainly be pleasant in many respects, and every one of the sensations alluded to has already been realized. However alluring the scheme may seem the day is far off when the system will be popular.

From the early part of the century up to the present day, inventors have brought forth one steam carriage after another, but at this time the number in existence in this country, to say nothing of those in use, may be counted on the fingers. Forty years have developed the locomotive of to-day, but the same period has witnessed little or no improvement in steam carriages. Variations in design, in detail, in the manner of applying the steam power have certainly been introduced, but the boilers used twenty-five years ago on steam carriages were quite similar to those now employed in locomotives, and no difficulty was found at that time in making all the steam required. The chief cause which led to the discontinuance of the street locomotive in early years is the same that affects it to-day—unpopularity. To be sure, in former periods a most active opposition was carried on against steam carriages by stage coach proprietors, but they had at that time as they have since had a fair trial and are not found desirable. The self-propelling steam fire engines, built in this city are seldom if ever used and we lately saw the finest and most powerful one ever built, the *Niagara*, torn to pieces at the Novelty Works. The private steam carriages built by divers ingenious men have also come to grief in one way or another, and quite recently the inventor of the latest one declared in our office that the continuous jarring the working parts were subjected to was a very great disadvantage, necessitating continual repair and giving great anxiety.

Admitting that all mechanical difficulties can be surmounted, the steam carriage for family use or for private purposes will never come into general use. When we can make every gentleman his own engineer, when we can renew a piston packing as easily as we can mend a broken harness, or repair a broken connection as speedily as a fractured thill, when we can adjust a displaced eccentric or a valve out of order as readily as a check-rein, when we can find fuel by the wayside and clean water as cheaply and with as little delay as we can bait a horse, when mankind in general are mechanicians and understand the cause and cure of disabled steam engines we may expect to see horses deposed and supplanted in a great measure by machines that never tire. Unless these things come to pass the adoption of steam carriages on common roads is a long way off. We have said nothing of more serious difficulties in the way of the employment of these vehicles, such as weight, damage to the roads, helplessness when broken down, and similar objections, but these militate greatly against the general introduction of steam carriages on common roads.

WHAT IS UTILITY?

A knowledge of the motions of the heavenly bodies is useful, because it enables the mariner to navigate his vessel with greater certainty and safety. But what is the use of navigation? There is no article absolutely necessary to the support of life that cannot be obtained without foreign commerce. The commodities brought from abroad are useful because they increase our enjoyments. Ships that come from Rio or Java enable us to have a steaming cup of coffee at breakfast in place of a tumbler of cold water, and those from China give us the cup that cheers but not inebriates, at tea. All things are useful which add to the sum of human happiness.

It is true that the demand for some things takes precedence of the demand for others. If we are deprived of atmospheric air for five minutes we perish, and the power of enjoying any earthly good is brought to an end. The next want in the order of imperativeness is some beverage for the gratification of our thirst, the next is food, the next clothing and shelter; and when these first necessities are satisfied, we desire, in various order, all the innumerable commodities which contribute in any way or in any degree to the gratification of our unlimited desires.

It is, of course, wise to direct our efforts first to procuring those commodities which are essential to the continuance of our lives. But when these are obtained in ample supply, it is just as wise to devote any further efforts that we may make, to the gratification of other and higher wants. A man with an income of $10,000 a year, who has in his cellar and storeroom all the food that his family can consume before it will spoil, may find that a good book or a handsome picture will contribute more to his enjoyment than an additional barrel of beef or chest of tea; in this case the book will be more useful to him than an additional quantity of food.

To Sir Isaac Newton a knowledge of the motions of the heavenly bodies was useful in two ways; it furnished him with the luxuries resulting from foreign commerce, and it gave him a higher and keener enjoyment in the intellectual gratification resulting from the acquisition and possession of the knowledge. Whatever contributes to this intellectual gratification is, in its proper place and time, as strictly useful as ships or machinery. No one recognised more clearly than Sir Isaac Newton himself the propriety of making intellectual pleasure subordinate to more imperative demands. When he was invited to lend the aid of his great intellect to the task of restoring the currency, the derangement of which was felt to be a greater burthen than the war then being waged against the power of Louis XIV., he accepted the invitation with alacrity; and when, through his efforts, milled coin of full weight were ringing on all counters, he returned to his scientific investigations with a keener enjoyment from the feeling of having discharged with fidelity his duty to his country.

There is nothing more useful than knowledge, and every kind of knowledge, by its power of contributing to either physical or mental enjoyment, is indued with its own measure of utility.

SALEM is about to add one more to the list of cities in Massachusetts which have provided themselves with an ample supply of water. Worcester and Charlestown celebrated such an event recently. Lynn, Springfield and New Bedford are engaged upon similar enterprizes.

CHARCOAL.

That a highly complex organized system, like the human body, should be subject to various conditions, such as drunkenness and soberness, sleeping and waking, disease and health, life and death, may not be surprising; but that carbon, a simple element, should exist in conditions as varied and opposite, is a puzzle and a mystery.

If we wish for some substance that will catch fire from the smallest spark, we find that among the thousands of bodies, simple and compound, that exist in nature or are produced by art, the most suitable for our purpose is pure carbon in the form of tinder. On the other hand, when we want a crucible that will bear without taking fire the flame of the hottest furnace, we make it of pure carbon in the form of plumbago.

The wax mold of the electroplater is a non-conductor of electricity, and it is therefore necessary to cover its surface with some good conducting material; it is found that the best material is finely pulverized plumbago. But this same element when crystalized as the diamond is the most perfect of all non-conductors.

Carbon in one state is as soft as lampblack, in another it is the very hardest substance known; in one, it is brilliantly transparent, in another, it is perfectly opaque; in one, it is the most costly ornament in the crowns of kings, in another, it is shoveled out of the way as worthless rubbish.

In all these changes in the condition and properties of carbon no law can be discovered, with the single exception that the temperatures at which various kinds of charcoal will take fire are in fixed relation to the temperatures at which the several kinds were prepared. This is of the utmost importance to the manufacturers of gunpowder, and they have caused it to be investigated with great care. The following table of the charring and ignition temperatures of charcoal from the same kinds of wood is given by Muspratt:—

Charring Temperature. Degrees.	Temperature at which the Charcoal takes fire.
500	644
518, 536, 554, 572, 590	644 to 680
608, 626, 644, 662	680 to 698
893	752
1873, 2282, 2372, 2732	1122 to 1472
Charcoal prepared at the point of the fusion of the cylinder	2282

THEY have set up a twelve-inch steam whistle at the Manchester Locomotive Works which, it is said, can be heard ten miles, and has a very decided effect on the sleepers in the morning.

THE TORPEDO SHIP.

In powder-mill explosions one of the most mysterious circumstances is the distance to which the fire will be communicated from one building to another. It is not uncommon for two or more distinct reports to be heard, the fire catching in one shop, and the flames an instant afterwards blowing up a second shop situated at the distance of several rods. So well is this understood by powder manufacturers that they resort to various precautions to prevent an explosion in one of their buildings from extending to the others, such as scattering their buildings at considerable distance apart, and planting groves of trees between them.

It was doubtless the design to render available this power of gunpowder explosions in blowing up the magazine of Fort Fisher. We should not have expected success, however, if the ship was to be fired at a distance of five hundred yards—more than a quarter of a mile. If the vessel could have been got within 100 yards, it is quite possible that the plan would have succeeded.

A NEW invention in France is said to be a pair of musical boots, which have been exhibited to the Emperor. At every step the pressure of the foot produces melody—it may be a waltz, a mazourka or an operatic air. This arrangement would be extremely convenient for a dancing master.



ISSUED FROM THE UNITED STATES PATENT-OFFICE
FOR THE WEEK ENDING JANUARY 3, 1865.
Reported Officially for the Scientific American.

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45,685.—Steam Pressure Gage.—E. H. Ashcroft, Lynn, Mass.:
I claim a corrugated disk spring, hardened or tempered substantially as set forth.

45,686.—Plaster and Seed Sower and Roller Combined.—Henry S. Babcock and S. H. Jenks, Ionia, Mich.:
We claim the plaster box, 14, having an unobstructed opening extending the whole length, the adjustable bottom plate, 13, and toothed reciprocating bar, 12, in combination with the seed-sowing device and land roller, the several parts being constructed and arranged substantially as and for the purpose set forth.

45,687.—Cultivator.—Ira Rarber, Jr., La Porte, Ind.:
First, I claim the pivots, c, pivoted with the pronged or forked ends, and arranged as shown in relation to the beam, c, and frame, O', in combination with the plow beams, L, operating as and for the purposes herein shown and set forth.
Second, I claim suspending the rear ends of the plow beams, L, by the chains, d, in combination with the pivoted front end of said beams, for the purpose of enabling the operator to give the shovels the lateral motion, substantially as and for the purposes herein specified.

45,688.—Combined Register and Summer Piece.—S. S. Bent. New York City:
I claim the combined register and summer piece for grate frames, constructed substantially as specified.

45,689.—Bread and Vegetable Slicer.—S. E. Blake, Worcester, Mass.:
I claim the combination of the eccentric slicer, G, adjustable feed box, feed block, N, and rack, O, when constructed and operated substantially as and for the purposes described.
I also claim the combination of the adjustable cam, P, with lever, Q, pawl, R, rack, O, and springs, h S, for the purpose of adjusting the length of the feed, substantially in the manner herein described.
I also claim the combination of the lever, Q, pawl, R, rack, O, and rod, U, for the purpose of disengaging the pawl from the ratchet, substantially as herein described.
I also claim, in combination with the revolving eccentric slicer, G, feed box and feed, the protecting shield, K, substantially as and for the purposes described.
I also claim the combination of the revolving slicer, adjustable feed box, and adjustable feed, when the several devices are constructed and arranged substantially as and for the purposes described.

45,690.—Refrigerator.—T. S. Blake and O. E. Mosher, New York City. Ante-dated Feb. 12, 1864:
I claim the arrangement of the air chamber, d, rack, c, and conducting plate, D', with the bottom, D, water trough and plate, E, and box, A, all in the manner herein shown and described

[This invention relates to a new and improved refrigerator, which is principally designed for operation on a large scale, for the use of butchers, etc.]

45,691.—Arms for Dolls.—C. F. Blakeslee, New York City:
I claim as an improved article of manufacture an arm for dolls constructed by stamping or cutting out of leather of suitable thickness with the fingers and adjacent part of the hand completely cemented together, so as to have the necessary form and rigidity, without stuffing, all as herein described.

[This invention relates to an improvement in the manufacture of doll arms of that class in which thin soft leather is used for a cover-ing or case, and the latter stuffed with cotton, wool, or other similar or suitable material.]

45,692.—Device for Trimming Lamp Wick.—H. F. Bond, Waltham, Mass.:
I claim the lamp trimming device constructed and operated as herein set forth.

45,693.—Vise.—A. H. Brainard, Dorchester, Mass.:
I claim constructing the bed plate of the stationary jaw with grooves both upon the outside and inside, the outer grooves receiving the tongues of the movable jaw, which is thus guided and supported, the inner groove receiving and affording a firm hold for a bolt, which secures the vise in position, and also allows it to revolve upon a changeable centre or to slide to and fro, substantially as described.
I also claim the nut, g, substantially as described.

45,694.—Lubricator.—John Broughton, New York City:
I claim, first, The arrangement of the shank and spindle, B I, and cap, C, in combination with a detachable reservoir, substantially as described.
Second, Combining and arranging the detachable reservoir, the shank and spindle, B I, and cap, C, in such manner that the said shank and cap are held firmly and rigidly together independently of the reservoir, said reservoir being free to contract and expand independently of the connection between the shank and cap, substantially as described.

45,695.—Roller for Cotton Gins.—Israel F. Brown, New London, Conn.:
I claim, first, Making the drawing-in or working roller of a roller cotton gin with a surface partly solid and partly elastic, substantially as described.
Second, I also claim putting elastic bands or rings around the roller of a roller gin in parallel and in continuous or in interrupted lines, substantially as described.

45,696.—Car Spring.—Andrew Buchanan, Brooklyn, N. Y.:
I claim, first, A spring for cars or other vehicles composed of two arms, each of which is supported at two or more points by blocks of india-rubber or other equivalent material, substantially in the manner and for the purpose herein shown and described.
Second, The set screw, f, in combination with the block, a, or its equivalent, and with the arms, A A, constructed and operating in the manner and for the purpose substantially as set forth.
Third, The toggle arms, C C, applied in combination with the arms, A A, and springs, a b b, in the manner and for the purpose substantially as specified.

45,597.—Propeller.—Jacob Bussier, Philadelphia, Pa.:
I claim the arrangement of the guides, frame, paddles, stays and levers, the whole being arranged to operate as herein set forth and for the purposes herein specified.

45,698.—Quartz Crusher.—Herman Camp, San Francisco, Cal. Ante-dated Sept. 17, 1863:
I claim the combination of the cylinder, A, and its peculiarly constructed head piece, B, with the dies constructed of a series of sections of cast iron, as shown in figures 3, 4, and 5, supported and revolving upon friction wheels the whole made, constructed and operating in the manner and for the purpose herein described.

45,699.—Wagon and Carriage Brake.—Lewis C. Carpenter, Lancaster, Ohio. Ante-dated Aug. 19, 1862:
I claim arranging the lever, R, horizontally, and making the weight upon it roll or traverse on a bar, substantially as described for the purpose specified.
And in combination with the lever, R, and weight or roller, S, I claim the link, W, lever, N, and shaft, L, and roller, X, substantially as described.

45,700.—Cultivator.—A. B. Cass, Chicago, Ill.:
First, I claim the combination of the adjustable lever, A, bar, a, levers, b, and plows, M, arranged and operating substantially as and for the purposes set forth and shown,
Second, I claim attaching the scrapers, J, to the axle, by one or more arms, K, substantially as and for the purposes shown and set forth.
Third, I claim the combination of the adjustable lever, A, with the rod, L, provided with the arms, I, or their equivalent, and the chains, h, operating as and for the purposes shown and specified.
Fourth, I claim the employment of one or more rollers, H, to facilitate the lateral motion of the lever, A, operating substantially as shown and described.
Fifth, I claim the employment of the roller, I, in combination with the lever, A, arranged and operating substantially as and for the purposes herein shown and specified.

45,701.—Breech-loading Fire-arm.—Francis Clark, Auburn, Mass.:
First, I claim the combination of the hammer, G, cartridge extractor, b, hook, m, and retaining spring, h, substantially in the manner and for the purposes herein described.
Second, I also claim the combination of the cartridge extractor, as herein described, with the extended arm, g, so that it can be operated either from the front, by means of said arm, or from the rear by means of the hammer, substantially as herein described.
Third, I also claim the application to the hammer of the regulating screw, 3, in combination with the cartridge extractor, substantially as and for the purposes described.

44,702.—Saw Mill.—G. H. Clemens, U.S.A.:—
First, I claim the hinged knee adapted to be turned down out of the way, in the manner and for the purposes herein specified.
Second, I claim the provision of supporting wheels or rollers, F, set or capable of being set obliquely to the track, substantially as and for the objects set forth.
Third, I claim the wheels, F, journaled in pedestals, G, susceptible of angular adjustments beneath the carriage, as represented.

45,703.—Machine for Shearing Sheep.—M. C. Davis, Guilford, Ohio:
First, I claim two bars, J J', formed each of two parts, g g', connected together by swivel joints, h h, and the bars connected by a joint, I, which admits of them working in a direction at right angles with each other; in combination with the bar, K, to which the shears are attached, said bar being connected to the bar, J', by a joint, M, similar to I, and all arranged substantially as and for the purpose specified.
Second, The shears, composed of the fixed cutters, o o, and the vibrating knife, Q, attached to the outer or front end of bar, K, the knife being operated from the shaft, B, through the medium of the pulleys, F H N, cords or bolts, G O, crank, p, connecting rod, R, and arm, q, all arranged substantially as set forth:

[This invention relates to a new and improved sheep-shearing device of that class which are driven by power, that is to say, horse, steam, water, or other power than human, the shears being simply guided by the operator.]

45,704.—Mounting and Operating Ordnance.—James B. Eads, St. Louis, Mo.:
First, I claim the employment of the cylinders, E E, in combination with the racks, f f f' f', gears, g g g' g', and arms, h' h' h'' h'', or their substantial equivalents in effect, all being constructed and arranged to operate substantially as and for the purpose herein set forth.
Second, In combination with the other operative mechanical devices for operating the frame, H, I claim the adjustable capstan, R, substantially as and for the purposes set forth.

45,705.—Clod Crusher.—William Fenstermacher, Shippensburgh, Pa. Ante-dated March 7, 1864:
I claim the combination with the main frame, A, and arms or hangers C C and C' C' of the cylinder, E, provided with blades, G, and the rear smooth roller, D, said parts being arranged and operating in relation to each other, as and for the purposes set forth.

45,706.—Apparatus for Aerating Dough.—Elisha Fitzgerald, New York City:
First, I claim supercharging the dough already aerated in the mixing receiver by forcing air or gas into it in the passage, K, at the time the faucet is opened to permit the exit of the dough.
Second, Forcing a jet of air or gas into the passage, K, at the time the dough is being expelled from the mixing receiver.
Third, Admitting the air or gas under pressure to come in contact and be infused in the dough in its passage out.

45,707.—Seeding Machine.—John M. Follett, Atkinson, Ill. Ante-dated May 14, 1862:
I claim the combination of the stopper slides, F, bar, G, and plow and coulter frame composed of the parallel bars, I, with the bars, l attached, the slides F, and plow and coulter frame being connected to the bar, G' and all arranged as shown to operate as set forth.

[The object of this invention is to obtain a machine of simple construction that will be capable of sowing seeds of various kinds and at the same time prepare the ground properly to receive it, the seed-stopper slides and plows being so connected that the distribution of the seed may be stopped and the plows elevated simultaneously by a simple manipulation of the attendant or driver.]

45,708.—Canceling Stamp.—John W. Foster, Washington, D. C.:
First, 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.

45,709.—Crutch.—T. E. Gordon, Brooklyn, Ohio:
I claim the finger, g, stops, g', and springs, n, in combination with the tube, h, and crutch, when arranged and operating conjointly, as herein set forth.

45,710.—Picture Medals, Buttons, &c.—Henry C. Griggs, Waterbury, Conn.:
I claim the countersunk or perforated ring, b, in combination with the shell, a, for securing the picture in the manner specified.
I also claim a loop upon the edge of the shell, formed substantially as specified.

45,711.—Press.—G. E. Harding, Bath, Maine:
I claim the toggle levers, F, having their fulcra on pivots projecting from the ends of the follower and applied in combination with straps, G, and with a rope or chain extending from a windlass over pulleys in the loose ends of said levers and through loops or pulleys attached to said levers near their fulcra, thence over pulleys fixed to the frame and down to the fulcrum pins of the levers, substantially in the manner and for the purpose set forth.
Also the straps, G, hinged at one of their ends to the frame, A, and at their opposite ends to the loose ends of the levers, F, in combination with said levers, and with the follower and windlass, constructed and operating substantially as and for the purpose described.

[This invention relates to a press in which two toggle levers are connected to straps hinged to the frame and to the follower, and operated by a windlass. The rope from the windlass extends over pulleys in the arbor or lever ends of the toggle levers and along the upper edges of said levers, through loops or under sheaves near their fulcrum, up over sheaves fixed to the frame and down to straps secured to the rod which forms the moveable fulcrum of said toggle levers, in such a manner that a strain on the rope has a tendency to raise the follower and the inner ends of the toggle arms, and at the same time to draw their loose ends together, and the follower is exposed to a powerful upward pressure.]

45,712.—Shutter Bolt.—Daniel C. Heller, Reading, Pa.:
I claim the revolving button, C or C', bearing against inclined planes, d or d', cast on the case of the bolt, or on a bridge placed over the same and having its shank or pivot riveted in a sleeve, D or D', through which the bolt, B or B', passes all arranged substantially as and for the purpose herein set forth.

[This invention relates to an improved shutter bolt of that class which admits of the shutters being secured in a partially open as well as in a closed state.]

45,713.—Railway Coupling.—D. H. Hise, Salem, Ohio:
I claim the two bars, B B', one, B, provided with the key bolts, C C, and the other provided with holes, through which and holes in the rails the key bolts or tangs pass; in connection with the keys, D D, all arranged substantially as and for the purpose specified.

[The object of this invention is to obtain a coupling for railway rails which will hold the ends of the same in line with each other so as to avoid the injury now occasioned by the hammering of the car wheels against the projecting ends of the rails, a contingency which soon injures the rails and renders their removal for repairs necessary long before any other portion is materially affected by wear.]

45,714.—Snap Hook.—Henry Hise, Ottawa, Ill.:
I claim, as a new article of manufacture, the snap hook constructed and operating in the particular manner herein specified.

[This invention relates to a hook of that class which are provided with a snap and spring to close the hook and prevent it from becoming casually detached from the article with which it is engaged and at the same time admit of the article being readily engaged with or fitted into the hook, and disengaged from it when required.]

45,715.—Self-loading Hay Cart.—Erastus Holt, Wheaton, Ill.:
I claim the rake, N, having its bar, O, provided between arms, P P, which are attached by pivots to the sides of the body, A, of the cart, in combination with the shaft, F, cards or chains, h h, lever, K, and the arm, I, or its equivalent, all arranged substantially as and for the purpose herein set forth.
I further claim the bar, G, pivoted between the arms, E E, at the sides of the front end of the cart body, in combination with the arm, I, at the rear of the draught pole, H, and the bar, J, attached to shaft, F, all being arranged to operate in the manner substantially as and for the purpose specified.

45,716.—Molder's Sprue.—M. R. Howell, Elizabethport, N. J.:
I claim a molding sprue constructed with concave sides and curved ends, as above explained, as a new article of manufacture.

[This invention consists in certain improvements in the construction of "sprues" used by molders in their art, whereby the work is facilitated, better castings are made, and less metal is wasted than when the ordinary form of sprue is used.]

45,717.—Street Gas Lamp Posts.—J. T. P. Hunt, Manchester, N. H.:
I claim constructing a lamp post with an enlargement for the location of a gas meter, with a door and fastening, as described, as a new article of manufacture.

45,718.—Thread Guide for Spinning Machines.—E. D. Hurst, Lancaster, Pa.:
I claim the use of a glass cylinder introduced into the eye of metallic guides through a perforation made for that purpose, in the manner specified.

45,719.—Lamp.—Henry C. Hutchinson, Cayuga, N. Y. Ante-dated Sept. 12, 1863:
I claim the combination of the ratchet, A, or the shaft, F, with the circular or curved wick tube, B, and basin or chamber, C, as and for the purpose substantially as described.

45,720.—Attachment of Trains of Boats.—Walter Ingalls, Sanbornton, N. H. Ante-dated Sept. 12, 1893:
I claim the connecting or coupling of boats for navigation on rivers or canals into continuous lines or trains, by the means or mode substantially as herein described and set forth.

45,721.—Corn Planter.—Hiram Jordan, Milford, Ohio:
I claim the arrangement of conveying hopper, A, crescent shaped dropper, B, lever, C, rod, D, spring, E, shave, F G, and roller, H, the whole being combined and operating together in the manner specified.

45,722.—Pump.—Edmund B. Jucket, Pawtucket, R. I.:
I claim the combination of the cylinder and valve plates constructed independent of the outer can, substantially as and for the purpose specified.

45,723.—Roofing.—John W. Kingman, North Bridgewater, Mass.:
I claim the spring plate, c d, fastened as described, and covered with cloth, cemented or pasted thereon, substantially as specified.]

45,724.—Lifting Dock.—Z. P. Leach, Danbury, Conn.:
I claim, first, The toggle levers, D, connected to each other by straps, E, or their equivalents, and operating in combination with the rising and falling beams, C, substantially as and for the purpose herein set forth,
Second, The supplementary beams, C', prinded with legs, b, and applied in combination with the main beams, C, and toggle levers, D, in the manner and for the purpose substantially as described

45,725.—Stump Extractor.—Hiram Lemm, Leonidas, Mich.:
I claim the combination of the parts involved in freeing the ratchet wheel, to wit, the lever bar, P O, bars, N, pawls, K, and segment wheel, Q, with the lowering brake levers, U S, and shoe, T, substantially as described and represented.

45,726.—Hay Loader.—Miles K. Lewis and John C. Durbin, Iowa City, Iowa:
We claim the combination of the transverse rod, j, lever, k, shaft, d, pulleys, c c, cords, e e, cross bar, g, with the rake, for the purpose of raising the rake with the gearing, a b, when the vehicle is backed to which the machine is connected.
We also claim the arrangement of the elevating belt of slats in connection with the rotating arms, P P, for joint operation, as and for the purpose described.

45,727.—Eyeletting Machine.—H. S. Lipman, Philadelphia, Pa.:
I claim, in combination with an eyelet machine, a die which makes a conical incision in the fabric for the reception of the eyelet with or without a central incision of a part, bearing the whole or a portion of the material to be embraced by the flange of the eyelet, substantially as shown and described.

45,728.—Cattle Stanchion.—Henry Maycock, Verona, N. Y.:
I claim the arrangement and combination of the lever, J, rope, K, operating on pulleys, P, and the sliding rail, L, when arranged and combined as herein described, for the purpose of operating the stanchions behind the cattle.

45,729.—Apparatus for Carburetting Gases.—S. T. McDougall, New York City:
I claim, first, The combination of a liquid or reservoir chamber, B, a reservoir, C, and a carburetting chamber, D, for the purpose herein specified.
I also claim the vessel, A, composed of a chamber, B, and a chamber, D, constructed and arranged substantially as and for the purposes herein set forth.
I also claim the construction and arrangement of the chamber, D, as provided with alternating close partitions, or divisions, 2 and 3, and intermediate fibrous, or capillary divisions, h i, substantially as and for the purposes herein specified.

45,730.—Cultivator.—Daniel McNabb, Moscow, Mich.:
I claim constructing a cultivator or drill tooth with an upper curved portion, which curved part shall have a bearing against some rigid portion of the machine when it is in motion, so that the form

of such curved portion of the tooth, and the position of the tooth, shall determine the amount of resistance which it may overcome without its being raised from the ground.

45,731.—Game.—B. E. Mead, Peekskill, N. Y.:

I claim, first, The construction of the holes, x x, in the walls, a b c d, in the manner and for the purpose, substantially as set forth.

Second, The making of marks, figures or indentations in the bottom of a box, in combination with figured holes in its sides for indicating the position of a marble at rest after being driven from one of the holes, in the manner and for the purpose substantially as set forth.

Third, The use of a flagstaff in combination with the holes in the sides of the box, in the manner and for the purpose substantially as set forth.

45,732.—Stovepipe.—David H. Metcalf and H. J. Shoemaker, Battlecreek, Mich.:

I claim, first, Adapting balanced dampers, b b, to operate partially when arranged at any desired point within the space formed by the two pipes, A B, substantially as desired.

Second, So constructing and arranging the dampers, b b, within a space formed by the two pipes, A B, that when these dampers are fully open they will be supported in this condition by the two pipes, A B, substantially as described.

45,733.—Car Coupling.—Loring Moody, Malden, Mass. :

I claim the combination of the separate curved pin, C, with the tripping lever, B, and the recessed bunter far, A.

I also claim the combination of the separate curved pin, C, and its holding mechanism, viz., the spring, D, and notch, i, or their mechanical equivalent or equivalents with the tripping lever, B, and the recessed bunter bar, A, the whole being substantially as described.

I also claim the combination of the slot, h, or its mechanical equivalent, with the tripping lever, its curved pin and the recessed bunter bar, the said slot being arranged in manner and for the purpose set forth.

45,734.—Mode of Constructing Frames for Portable Houses.—Jacob Morgan, Dundee, Ohio :

I claim a portable sawmill frame constructed and arranged with braces and tightening rods, substantially as herein specified.

45,735.—Ditching and Mole Plow.—E. H. Morton, Oxford, Iowa :

I claim, first, Attaching the sweep, E, to the capstan, B, by means of the journal, c, and slotted bar, D, on the latter, and the eye, d, on the sweep, substantially as and for the purpose set forth.

Second, In combination with the sweep, E, the adjustable ball support, G, constructed and applied to the capstan frame, A, to operate as and for the purpose described.

Third, The securing of the coulter, K, to the beam, H, through the medium of the slot, a, and adjustable plates, J J', arranged substantially as herein set forth.

[This invention relates to a new and improved plow of that class which are commonly termed mole plows, and are used for forming subterranean drains.]

45,736.—Machine for Condensing Pap or Slops of Clay for Potter's use.—Joseph Muir, New York City :

I claim, first, The whirling vessel having imperforated sides impermeable to water and inclining inward or with a rim at the top and combined with mechanism for rotating it, substantially as described and substantially for the purposes hereinbefore set forth, and with the draw-off pipe, h, or its equivalent, in combination with the whirling chamber.

Second, I claim securing the whirling vessel to the rotating mechanism by means of a disk or platform, e, and the screw bolts, g, and g', or their equivalents, for the purpose of conveniently attaching or removing the whirling vessel.

45,737.—Process of Preparing Clay for Potter's Use.—Joseph Muir, New York City :

I claim, as my improvement in the process of preparing clays for potters' use or for the market, the above described improved mode of condensing the pap or slops of clay by subjecting the slops in proper quantities to the action of centrifugal force in a whirling vessel having imperforate and impermeable sides, substantially as described, whereby the clay, by reason of its subsidence and greater specific gravity, is condensed and separated from the water to the desired extent, without recourse to straining, by which a portion of the clay is lost and adheres to the sides of the vessel from which it may be removed in a plastic state for potters' use, or to be prepared in the usual manner for the market as potters' clay.

45,738.—Hand Punches.—William Nash, Watertown, N. Y. :

I claim, first, A hand punch for cutting leather, paper, metals and other materials, wherein the punch lever is independent of the movable arm of the handle of the punch, but is operated by the toe thereof as by a free lever not connected with the punch lever by any joint or hinge, substantially as above described.

Second, I also claim the combination with a hand punch of any adjustable gage, i, substantially as and for the purpose above set forth.

45,739.—Steam Boiler.—John E. Neill, Brooklyn, N. Y.:

I claim incasing a portion of the tubes of a tubular steam boiler, substantially as herein described, so that such casing shall extend on one side to the steam chamber of the boiler to receive steam generated in the boiler and conduct it to the tubes so incased, to be thereby superheated, and on the other side communicate with the outside of the boiler to carry off the steam after it has been superheated substantially as described.

I also claim combining with superheating tubes, or the equivalents thereof, a water tube or tubes or the equivalent thereof, for the protection of the tubes or flues of a superheater against the intense heat of the products of combustion, by causing such products to act first on the surfaces protected by water, substantially as herein described.

45,740.—Grain Screen.—Harrison Ogborn, Richmond, Ind. :

I claim the cam wheel, J, and lever, K, in combination with the riddle, G, screen, I, and adjusting straps, E, the several parts being constructed, arranged and operating substantially as and for the purpose set forth.

45,741.—Lumber Measure.—A. M. Olds, Chicago, Ill.:

I claim, first, A lumber measure arranged substantially as described, so that with a measuring disk of uniform diameter the superficial feet of boards of different lengths can be determined.

Second, The nest of wheels, f f' f'', etc., applied in combination with the disk, A, sliding shaft, h, and index hands, c d, substantially as and for the purpose set forth.

Third, The shoe, p, in combination with the measuring disk, A, constructed and operating substantially as and for the purpose described.

[The object of this invention is to produce a lumber measure which, with a measuring disk of uniform diameter, is capable of indicating the number of superficial feet contained in boards of different lengths.]

45,742.—Cutter Stock.—John Peace.—Camden, N. J. :

I claim, as a new article of manufacture, a cutter stock constructed as herein shown and described.

[This invention relates to a new and improved cutter stock for cutting screws on gas and other pipes, and it consists in the employment of double cutters fitted in a stock peculiarly constructed, whereby the cutters may be readily adjusted, and either end used to operate upon pipes of different diameters, and the cutters accurately adjusted to suit the diameter of the pipe to be acted upon.]

45,743.—Sausage Filler.—John G. Perry, South Kingston, R. I.:

I claim the construction of the nozzle, s, and cylinder or case, A, with the piston head and rack, B, constructed substantially as herein described and for the purpose set forth.

45,744.—Meat Cutter.—John G. Perry, South Kingston, R. I.:

First, I claim the combination of the knives, x x x, with the plates, S, constructed substantially as described and for the purpose set forth.

Second, I claim the combination of the knives and plates, S, with the case, A, and shaft, B, substantially as herein described and for the purposes set forth.

45,745.—Stovepipe Elbow.—J. G. Perry, South Kingston, R. I. :

First, I claim as a new article of manufacture a cast-iron stovepipe elbow made in two parts and having one end made small enough to receive the pipe on the outside and the other end large enough to receive the pipe on the inside, with the projections or fastenings, when constructed substantially as herein set forth and for the purpose specified.

Second, I claim the combination of the damper with the two parts of the elbow, substantially as herein described and for the purposes set forth.

45,746.—Machine for Cutting Soap.—J. G. Perry, South Kingston, R. I.:

I claim the combination of the wire, R, lever, B, and box, A, substantially as herein described and for the purpose set forth.

45,747.—Window-sash Supporter.—J. G. Perry, South Kingston, R. I.:

I claim the combination of the two cams or curved levers, with the projections, o c, constructed substantially as herein described and for the purpose set forth.

45,748.—Boot and Shoe Last.—John C. Plumer, M. D. Portland, Maine :

I claim, first, In the construction of a shoe last, the transverse inclined planes, L G, and Y Y, as described, in combination with the prominences, G L, as described.

Second, The form and location of the prominences, G L, as described.

Third, The form and location of the concavity, D D D D, as described.

Fourth, The combination of the planes, concavities and prominences, as described.

45,749.—Fan Blower.—Rufus Porter, Malden, Mass.:

I claim the regulator, I J K L M N, in combination with the cams, A B, in box, c, all combined for the purpose herein specified.

45,750.—Cultivator Gang Plow.—T. T. Prosser and M. C. Darling, Chicago, Ill., and K. A. Darling of Fond du Lac, Wis.:

First, We claim guiding and regulating the movement of the tongue, D, by means of the pulley, H, chain, F, eye bolts, G, attached to the side frame, A, and levers, H, substantially as described.

Second, Connecting the pair of draft arms, B B, without regard to the number of pairs used to the forward main cross bar of the frame, A, by means of the double nutted screw bolt, L L, and which forms with the plates, M M, a hinge or other joint, so that whilst the said bars shall have a free vertical motion, they may be adjusted laterally without being detached or removed from the said crossbar.

Third, Constructing a cultivator or gang plow, so that the interval between the shank, N N, which supports the plow shares, may be increased or diminished without removing the shaft bars, B B, or their connections, from the main crossbar of the frame, A, when each pair of shaft bars are capable of lateral adjustment, independent of the other pair or pairs.

Fourth, The combination of lever, T, rods and polls, U U, operating the ratchet wheel, S, upon the roller, O, for elevating simultaneously the several plows of the gang or gangs, substantially as set forth.

45,751.—Meat and Vegetable Slicer.—G. B. Pullinger. Germantown, Pa.:

I claim, first, The adjustable rotating gage plate, D, as described and for the above purpose.

Second, I claim the scoring knives, c c c, in combination with the rotating gage plate, as described and for the above purpose.

Third, I claim the slotted stay, r, for securely holding the end of the cutter, C, as above described and for the purpose specified.

Fourth, I claim the frictional feed motion, as constructed, and operated as described for the above purpose.

45,752.—Self-oiling Spindle Bolster for Spinning Frames.—W. T. Rippon and Thos. R. Robinson, Providence, R. I.:

We claim, first, The oil chamber composed of a socket tube with collars or flanges, d e, applied in combination with the oil chamber, b, formed within the rail, substantially as herein specified.

Second, The washer or gasket, D, arranged within the oil chamber and the nut, C, applied to a screw thread on the bolster below the

45,753.—Instrument for Determining the Variation of the Compass.—E. S. Ritchie, Brookline, Mass. :

I claim the construction of the rotary compass card, A, the separate supporting index plate, c, the rotary bar, D, provided with sights or their equivalents, the clamp, F, and the index pointer, G, or its equivalent, the whole being arranged and applied substantially as specified.

And in combination therewith I claim the divided limb, H, and the auxiliary sight index, I.

44,754.—Press.—Charles H. Robinson, Bath, Maine :

I claim the levers, D D, attached to the platten or follower, c, in combination with the swinging arms, E E, and the ropes, O G, all being arranged and applied to operate in the manner substantially as and for the purpose herein set forth.

[This invention relates to a new and improved press for baling, and it consists in a novel arrangement of levers applied to the follower or platten, in such a manner as to render the press very compact and also very efficient in its operation.]

45,755.—Water Wheel.—Joel Sanford, Polo, Ill.:

I claim a water wheel constructed with buckets, C, each formed of three arcs, described from the several centers, d f' a', all as herein shown and described.]

[This invention relates to a new and improved horizontal water wheel, and it consists in a novel construction of the buckets, whereby it is believed that a large percentage of the power of the water is obtained.]

45,756.—Steam Engine.—Daniel Sexton, San Gabriel Cal. :

I claim, first, The two pistons, D D', connected together by the bar, E, and operating in open cylinders A A', in combination with the abutment, C, valve, H H*, and ports, d d* d' d*', in the manner and for the purpose substantially as herein shown and described.

Second, The lever, F, and sheds, a a', in combination with the pistons, G, and valves, H H*, constructed and operating substantially as and for the purpose set forth.

Third, Hinging the lever, F, as and for the purpose specified.

45,757.—Ore Separator.—Edward L. Seymour, of New York City. Ante-dated Dec. 3, 1862 :

I claim the combination of trunk or cylinder, G, with the movable drawer, F, for the purpose of separating and separately delivering the refuse and the concentrated portion of each separate charge, as described.

I also claim, in combination with the cylinder, G, the air pipe, V, as described, and for the purpose described.

I also claim the combination of the exhausting apparatus, A, or its equivalent, with the movable box, F, with or without the cylinder, G, as described, and for the purposes described.

45,758.—Cultivators.—Lyman Sherwood, of Marine, Ill.:

I claim, first, The arrangement of the frame, A A' A', with its teeth or plows, c c, in combination with the rollers, B B, all being constructed and arranged to operate, substantially as and for the purposes set forth.

Second, I claim the arrangement of the pole, E, with reference to the frame, A, and standard, f, substantially as and for the purposes set forth.

45,759.—Car Seats of Railway Cars.—Edwin F. Shoenberger, of Philadelphia, Pa.:

I claim the bar, L, and its teeth, in combination with the cog wheel, f, so connected to the backs of the whole row of seats that one back cannot be moved without disturbing the whole, as set forth for the purpose specified.

45,760.—Grates for Furnaces.—William H. Short, of Brooklyn, E. D., N. Y. Ante-dated Aug. 19, 1863 :

I claim the combination and arrangement of the grate bars, B, so as to form spaces, c, between their inner ends in the middle of the grate, A, and the beveled shoulder of the adjoining bars, substantially as and for the purpose herein shown and described.

[The invention consists in the arrangement of spaces between the inner ends of divided grate bars, their outer ends being held in place by hooks catching over the front plate and over the bridge wall, or over bars connected with or attached to said plate and wall, in such a manner that each grate bar can expand and contract without impediment or obstruction, and consequently said bars are not liable to injure the structure of the wall in which the boiler is set, neither are they liable to bend or break by the expansion.]

45,761.—Ash Cart.—Robert A. Smith, of Philadelphia, Pa. Ante-dated July 21, 1363 :

I claim a cart having a receptacle composed of permanent side, D, and permanent ends, D', and the tilting of dumping box, G, hung or secured to a shaft, F, and constructed and applied to the permanent portion of the receptacle, substantially as and for the purpose herein set forth.

45,762.—Process of Preserving Organic Substances.—J. Galusha Staunton, of Buffalo, N. Y. Ante-dated April 3, 1862 :

I claim the method of preserving fruits, vegetables, and the like, by means of forming an external crust, shell or covering of paraffine in contact with the body of the fruit or thing to be preserved, substantially as described.

45,763.—Vessels for Preserving Butter and other substances.—J. Galusha Staunton, of Buffalo, N. Y. Ante-dated April 3, 1862 :

I claim as a new article of manufacture a box, can or vessel, for preserving fruit, vegetables, meat, butter, spices and the like, constructed of wood and made air tight by an internal lining or enamel of paraffine or equivalent, substantially as described.

45,764.—Cases for Preserving Animal and Vegetable Substances during Transportation.—J. Galusha Staunton, of Buffalo, N. Y. Ante-dated May 5, 1863 :

I claim, first, A transportation case, having a plurality of walls, substantially as described, in combination with a distinct ice chest in connection therewith, for the purposes set forth.

Second, A skeleton framework of wood covered with leather, cloth, rubber or other equivalent materials, in a manner to form a plurality of walls, which spaces may be filled with cotton, wool or other poor conductor of heat, or dead air, for the purpose and substantially as described.

Third, An ice chest, made separately from a transportation case, and so combined and connected to the outside of the case that a free communication of air from the ice to the interior case is secured, substantially as set forth.

45,765.—Preserving Fruit, Meat, Fish, Etc.—J. Galusha Staunton, of Buffalo N. Y. Ante-dated May 18, 1863 :

I claim the substitution of hydro-carbon gas, in the place of air in the cans or vessels in which fruit or other substances may be inclosed for preservation, for the purposes and substantially as above set forth.

45,766.—Air-tight Boxes, Cases, Etc.—J. Galusha Staunton, of Buffalo, N. Y. Ante-dated May 18, 1863 :

I claim the application and use of a thread or welt of rubber throughout the joints of wooden or board packages, for the purpose and substantially as described.

I also claim coating or lining the inside of such wooden packages with paraffine, warp, gum, or other impervious substance, in combination with the welted joint, for the purpose and substantially as described.

45,767.—Device for Spreading Manure.—James H. Stevens, of East Durham, N. Y.:

I claim, first, The two ropes, d d', with the shaft, F, for operating the apron, D, and admitting of the same being moved back when the load is discharged.

Second, The semi-conical screw, K, at the rear of the wagon, when used in connection with a manure-discharging device, for the purpose set forth.

Third, The discharging fork, I, arranged to operate substantially as herein described, in connection with the apron, D, or its equivalent, for the purpose set forth.

[This invention consists in applying to a wagon a movable bottom, composed of an apron, which works on friction rollers, and using in connection with a movable bottom a fork arranged and operated in such a manner as to discharge the manure evenly or uniformly from the wagon as the former is presented or fed to the fork by the movable bottom. The invention further consists in the employment or use of a semi-conical screen, attached to the rear of the wagon, for the purpose of receiving the manure as it is discharged by the fork, and insuring a uniform distribution of the same upon the field.]

45,768.—Process for Preparing Refuse Wool for Use.—Leonard T. Stiastny, of Hoboken, N. J.:

I claim the treatment of the wool as described, by applying to it in connection with the treatment of it by an acid solution, as described, but prior thereto, steam, in the manner substantially as set forth.

I also claim in connection with the treatment of wool by an acid solution, as described, and after the said treatment is completed, the application of a high degree of heat to the wool during the drying process, for the purpose of burning the vegetable parts which may still adhere to said wool, substantially as described.

45,769.—Horse Rakes.—Joshua C. Stoddard, of Worcester, Mass.:

I claim the operating of the rake to enable it to discharge its load and to bring it back to a working position by means of the adjustable shaft, M, pinion, P, having the cam, R, attached to its inner side, composed of a circular rim, e, with two recesses, f f, the fixed roller, g, wheel, Q, and lever, O, with spring, d, all arranged and combined to operate in the manner substantially as described.

[This invention relates to a new and useful improvement in means for operating the rake, so that the latter may be held in proper position to its work, and readily raised when necessary in order to have its load discharged.]

45,770.—Combination of Pen Rack, Calendar and Letter Balance.—Horatio N. Taft, of Washington, D. C. Ante-dated Nov. 27, 1864 :

I claim the calendar, constructed and arranged substantially as described, and its combination with the pen rack.

I also claim the combination of the calendar with a balance or weighing scale, and also the combination of the letter balance with a pen rack, as set forth.

45,771.—Method of Securing Barrel Heads.—Joseph T. Tomkins, of New York City. Ante-dated Nov. 24, 1861 :

I claim the use of the piece, A, substantially in the manner and for the purposes described.

45,772.—Grain Separators.—B. T. Trimmer, of Rochester, N. Y.:

I claim combining the shoe, D, and fan case, E', in one body, thereby dispensing with an outer casing, substantially as herein set forth.

I also claim supporting the shoe, D, and fan case, E, combined in one body, on the main shaft, a, by means of the cams or cranks, b, and in such a manner as to impart a universal vibration, substantially as herein specified.

45,773.—Caster for Furniture.—Alfred Walker, of New Haven, Conn.:

I claim a combination of vertical and horizontal grooves, with or without the rest, c, with a pin to traverse the same, substantially as is herein described.

45,774.—Blasting Fuse.—Thomas H. Walton, of Ashland, Pa.:

I claim the safety-blasting fuse, constructed substantially as above set forth.

[This fuse is intended as a substitute for the metal barrel fuse, the flexible fuse and other kinds, and it is made by plowing a narrow groove in a strip of wood, in which is laid a train of powder or common fuse, and the train covered by any suitable water-proof material.]

45,775.—Broadcast Seeding Machines.—George W. Warren, of Ossian, N. Y.:

I claim the jointed bar, G, provided with the arm, p, in combination with the harrow, C, standard, m, shaft, H, and frame, A, the whole so arranged that while the draught is applied centrally to the harrow the latter is prevented from overturning, substantially as herein set forth.

45,776.—Combined Spur-Carrier, Boot-Drawer and Pantaloon Guard.—Egbert P. Watson, of New York City:

I claim a metallic plate, constructed substantially as above described, so that it can be attached by springs or screws to the heel of a boot, for the object hereinbefore specified.

45,777.—Sewing Machines.—Wm. Weitling, of New York City:

First, I claim the combination in a sewing mechanism of one or more revolving thread leaders and their supports, with the adjustable frame of the cloth presser, so that all of them may be raised and lowered by the same mechanism, substantially as and for the purposes set forth.

Second, I also claim supporting the bobbins which supply the revolving double thread carrier on a revolving table, for the purpose of preventing the threads from twisting before reaching the double thread carrier, substantially as and for the purposes described.

Third, I claim a feeding device, feeding the fabric by the action of a chisel-edged pad against the inclined under surface of an upper reciprocating pad or cloth pressure, thus operating by a pinching and direct angular pressure instead of by vertical pressure, substantially as and for the purposes set forth.

Fourth, I also claim the combination of the levers, F, and toggle arms, G, with the needle bar, C, and thread guide, g, constituting my thread-delivering regulator, substantially as and for the purposes described.

Fifth, I also claim the application to a sewing mechanism of the turning table, H', upon the bed plate, A, serving as a support to the fabric, and having the needle as the center of motion, when said table is suspended to the needle arm, substantially as and for the purposes described.

Sixth, I also claim securing the guide pins, O, to the adjustable frame, F, of the cloth presser, so that they can be raised and lowered together with said cloth presser, substantially as and for the purposes described.

I also claim a feeding device, with smooth surfaces, operating by the angular motion of two parts acting on each other, and thus gripping the fabric between them and moving it forward, substantially as described.

45,778.—Railroad Cars.—R. T. M. Wells, of Franklin Centre, Vt.:

I claim the loose pulley, D, with draft chain, I, attached, in connection with the ratchet, E, attached permanently to the axle, C, and the pawl, F, placed within the pulley, to operate in the manner substantially as and for the purpose set forth.

I also claim the eccentrics, G G, in connection with the rod, b, passing through the pawl, F, all arranged as shown, to free the pawl from the ratchet when the pulley is thrown back, as herein described.

I also claim the coil spring, H, in combination with the pulley, D, ratchet, E, and pawl, F, arranged substantially as and for the purpose specified.

I further claim the stops, g g, attached to the eccentrics, G G, when used in connection with the pulley, D, spring, H, pawl, F, and ratchet, E, for the purposes set forth.

45,779.—Converting Rotary into Reciprocating Motion.—P. Werni, of Manchester, Mich.:

I claim the employment of inclined planes, a d, and spring, e, in combination with the double rack, A, and pinion, B, constructed and operating substantially as and for the purpose set forth.

[This invention relates to an improvement in that class of devices for converting rotary into reciprocating motion, in which a pinion is used which has its teeth cut away on one-half of its circumference, and which gears alternately in the upper and then in the lower edge of a double rack, so that by imparting to said pinion a rotating motion the double rack assumes a reciprocating rectilinear motion.]

45,780.—Garment Measuring.—John B. West, of New York. Ante-dated Sept. 8, 1862:

I claim using instruments substantially such as specified, or their equivalents, upon or against the specified parts of the body, in such manner that right angles or corners are formed by them at the points where they cross or intersect each other and from the sizes and forms thus ascertained may be readily drawn by running in from a perpendicular line, producing a bust of the measured body upon cloth, which bust used in connection with certain measures herein indicated, taken from the body, but not embraced in the bust, and with the ordinary graduated tape, serves as a guide or basis from which to draft with certainty a garment the size and shape of the body measured as set forth

45,781.—Buttons.—Elonzo S. Wheeler, of Westford, Conn.:

I claim the combination of the two washers or discs with the hollow shank and the button, substantially as and for the purposes described.

45,782.—Cultivator.—Thomas Wiles and James McGinnis, of Muscatine, Iowa:

I claim the combination of the rising and falling or vertically-adjustable plows, O, with the rising and falling and laterally-adjustable plows, I, when the latter are pivoted to shafts, D D, and connected to the shafts, P, so as to rise simultaneously with the plows, V, on the turning of the shaft, P, as and for the purpose herein set forth.

[This invention relates to a new and useful improvement in that class of cultivators in which the plows that work by the sides of the rows of plants are capable of being adjusted laterally, in order that they may conform to the sinuosities of the rows.]

45,783.—Stove.—William Wheeler, of Poultney, Vt.:

I claim the employment of the spherically-shaped fire-pot or chamber of combustion, B, or its equivalent, with numerous small apertures, b, in the upper surface thereof, in the manner and for the purposes substantially as herein described and set forth.

I also claim the employment of the contracted and oblong throat, D, and the narrow circular flues or throats, D D, in the manner and for the purposes substantially as herein described and set forth.

I also claim the combination of the said throats or flues, D, with the said fire-pot or combustion chamber, B, and with the heating or radiating chamber, c, substantially as and for the purpose herein described and set forth.

45,784.—Window Sash Suspenders.—John H. Williams, of Oakland, Cal.:

I claim the arrangement and combination of the pulley plates, M M, grooves, L L, plate hooks, B B, and slotted bar, H, substantially as described, for the purpose set forth.

45,785.—Machine for Drawing Bolts by Hydraulic Pressure.—Seth Wilmarth, of Boston, Mass.:

I claim a bolt-drawing machine, consisting of a vice or jaws for grasping the bolt, in combination with a hydraulic lift for withdrawing the same, operating substantially in the manner herein set forth.

45,786.—Steam-Pressure Gages.—Edwin A. Wood, of Utica, N. Y.:

I claim the combination of the disks, A and B, or the ring, D, or their equivalents, constructed and operating substantially as described, for the uses and purposes.

45,787.—Coffee Pots.—Hiram Young, of New York City. Ante-dated Dec. 11, 1861:

I claim the combination of the two strainers, E F, tube, C, and faucet, B, arranged with the body, A, substantially as and for the purposes set forth.

I further claim constructing the top or cover, G, of the coffee pot, with an opening at its apex to admit of the inserting of the top and its attachments to the tube, C, to serve the purposes of a funnel, as described.

[This invention relates to a coffee pot of that class in which the coffee is made by leaching or percolating, and consists in so arranging certain parts that the hot water will be forced upward through the ground coffee, and then again passed down through it before being drawn for use, thereby causing the extraction of all the strength from the coffee, and by a very simple arrangement of means.]

45,788.—Meat Cutter.—Wm. G. Bell (assignor to Wm. G. Bell & Co.), of Boston, Mass.:

I claim, first, The employment or use of a movable guide, I, in combination with the cutter head, F, substantially as and for the purpose set forth.

Second, The endless screw, M, and worm wheel, N, applied in combination with the center pin, C, bridge, B, and block, D, in the manner and for the purpose substantially as described.

45,789.—Spring Gun.—John E. Blythe, of New York City, assignor to M. Vedder and Henry S. Myers. Ante-dated May 2, 1862:

I claim the use and application to guns and pistols of one or more revolving concave rollers or pulleys, upon or around which India-rubber or other elastic material is made to pass, thus securing an additional length of stretch or propelling force in a given space, increasing in proportion to the number of rollers used; also, the combination of India-rubber in guns and pistols, with slide-roller and groove, as described.

45,790.—Machines for Cutting Chair Splints.—Thomas N. Davey (assignor to himself and Thomas Davey, Sr.), of Jeffersonville, Ind.:

I claim the reciprocating bed, B, provided with the dogs, c c' c'' c''', in combination with the endless belt, C, with pin or stud, g, attached, and the slotted bar E, at the under side of the bed in which the pin or stud works, substantially as and for the purpose specified.

Second, The beam, J, with adjustable blocks, K K, attached, the latter provided with the vertical sliding blocks, L, having cutter bar or stocks, M, secured to them by hinges, q, when said parts are used in connection with a reciprocating bed, B, as and for the purpose specified.

Third, The means employed for automatically feeding the beam, J, downward, to wit: the bent arm, b', rod, S, rock arm, R, pawl, a', and ratchet, b, in connection with the projection, a, on the bed, E, all arranged substantially as set forth.

Fourth, The knives, N N', attached to the bars or stocks, M, in connection with the guard plates, O, substantially as and for the purpose specified.

[This invention relates to a new and useful machine for cutting splints for chair bottoms, and for other or similar purposes. The object of the invention is to supersede the slow and laborious process of manufacturing splints by hand, by producing a superior article in an expeditious manner.]

55,791.—Manufacture of Paper Stock.—William Delton, (assignor to himself, Chas. W. Baker, James M. Sheehan, Michael Tooney, Lawrence R. Fitzgerald and James T. Derrickson), of New York City:

I claim, first, The tank, a, partitioned off at b, and provided with the perforated steam pipes, c c, for the purpose and as specified.

Second, I claim boiling the vegetable fiber in the vegetable caustic alkaline solution, when said vegetable material is sustained by a perforated bottom above heating pipes, as set forth.

Third, I claim the treatment of vegetable fiber by an alkaline solution prepared in the manner and of the material set forth.

45,792.—Drop Presses.—Henry C. Gladding, of Providence, R. I., assignor to himself, W. Coleman & Sons, and Joseph Ralph. Ante-dated June 20, 1863:

First, I claim the combination and arangement as set forth of the friction pulley, D, and the winding pulley, G, with the strap of a drop hammer, substantially as herein described, for the purpose specified.

Second, In combination with a suitable device for elevating a drop or hammer to any desired hight at will, a spring force suitably arranged, acting with sufficient swiftness to take up any slackness in the lifting strap occasioned by the rebound of the hammer, substantially as herein shown and described, for the purpose specified.

Third, In combination with the lifting strap of a drop hammer, a break or stop, having a nipping or binding action, conveniently arranged, with a hand lever or other suitable device, and operating substantially as herein shown and described, for the purpose specified.

Fourth, I claim the peculiar manner herein shown and described of securing the guides to the anvil to effect the purpose set forth.

Fifth, I claim constructing one of the guides with a movable piece, substantially as herein shown and described, for the purpose specified.

Sixth, I claim the peculiar construction and arrangement herein shown and described of the hubs or heads, S S S S, to effect the purpose set forth.

Seventh, I claim, in combination with the anvil and die of a drop press, the sliding punches and percumine lever, K, arranged and operating substantially as herein shown and described for the purpose specified

45,793.—Process of Preparing Grain for Distillation.—Joseph Fleischman, of New York City, assignor to himself and Aloes Fleischman, of Olmutz, Austria:

I claim the use of the method or process hereinbefore described of treating or preparing India corn and other cereals in the manufacture of alcohol and spirits, as an improvement upon Aloes Fleischman's patent of July 12, 1864, for a like purpose.

55,794.—Inkstands.—Franklin L. Hicks (assignor to Benjamin and Phineas Lawrence), of New York City:

I claim the combination of the elastic bottom of the inkstand with the turning rod and cam for the purpose and as specified.

45,795.—Perpetual Calendars.—Henry W. Holly (assignor to himself and John T. Fanning), of Norwich, Conn.:

I claim the use of the rollers, A B, marked as described, and applied to a common axle, C, which has its bearings in suitable lugs rising from a paper weight or in a pen rack or other similar article, in the manner and for the purpose substantially as set forth.

[The object of this invention is a perpetual calendar, which can be readily attached to a paper weight, pen rack, or other similar article, used on or about a writing desk.]

45,796.—Fanning Mills and Grain Separators.—Harrison Ogborn, of Richmond, Ind., assignor to himself and Almond T. Chapin, of Paw Paw, Mich.:

First, I claim the rocking support, K, adapted to transmit motion to the shoe, E, in the manner explained, and constituting a medium for preventing the existence of a counter current of air, thus increasing the efficiency of the operating current.

Second, I claim supporting the shoe at its rear end by means of arms, O, provided with elliptical or oblong apertures, o, fitting over screws or bolts, having elongated heads, o', which admit of the ready adjustment of the arms, O, as and for the purpose explained.

Third, I claim the strip or flexible attachment, P, for giving a vertical motion to the screw, I, simultaneously with its reciprocating movement, substantially as described.

Fourth, I claim the bearings, I2, when curved in such a way as to allow the arms, i', which they support to be readily removed for adjustment, while preventing their accidental displacement, as herein set forth.

Fifth, I claim the combined screw and grain board, D D', arranged and employed in the manner and for the purposes specified.

Sixth, I claim the deflectors or guides, J J, for regulating the fan blast, when the same are pivoted directly to the main frame of the machine (in contradistinction to being pivoted to the shoe) and adjusted by means of the catches, j, and holes, a, in the manner and for the purpose explained.

Seventh, In combination with the doors, Q, of the fan case, I claim the slotted bar, R r, and pins or projections, q q, arranged to operate substantially as and for the purpose described.

Eighth, I claim the circular distributor, C2, employed to prevent the grain from accumulating at the center of the screw, D, substantially as and for the object specified.

Ninth, I claim the grooves, d' d', in combination with the flange, f, of the screw, F, said groove and flange admitting of the formation of a continuous conducter for the grain in both positions of the box, D D' D'', substantially as explained.

45,797.—Breech-loading Fire-arms.—Joseph Rider, of Newark, Ohio, assignor to himself and E. Remington, of Ilion, N. Y.:

I claim, first, The combination of the hammer, tumbler and swinging breech piece operating together, as and for the purpose substantially as described and represented.

I also claim, in combination with the tumbler, breech piece and sear, the sear guard, e, e, operating therewith, as and for the purpose substantially as described and represented.

45,798.—Reaping and Mowing Machines.—Thomas Swan, of Manlius, N. Y., assignor to himself, E. B. Alvord, A. W. Field, and James Coburne, of Syracuse, N. Y.:

I claim, first, The wheel, D, provided with teeth, e, carved at one side, as shown at I, in combination with two pallets, E E', connected by the rod, F, all arranged to operate substantially as and for the purpose herein set forth.

Second, The rock shaft, J, provided with the pendant arm, K, and operated through the medium of the arbor, I, and arm, G, when said parts are used in combination with the wheel, D, pallets, E E', and rod, F, and all arranged in the manner substantially as and for the purpose set forth.

The elastic bumpers, N N, in connection with the vibrating arm, K, substantially as and for the purpose herein specified.

[This invention relates to a new and improved means for operating the sickle, whereby a rapid movement or stroke is given the latter, and an even or uniform motion obtained without the jars and concussions and consequent wear and tear which attend the use of the ordinary crank. The invention also possesses the advantage of being very compact, and capable of being applied at a small expense, it being composed of but few parts.]

45,799.—Pumps.—Mary P. Walters, administratrix of W. E. Waters, deceased, of East Bend, Ky., assignor to Aquila H. Pickering, of Salem, Iowa:

In combination with the hollow piston shaft, G, cylinder, A, and side passage or pipe, B, I claim a piston, E, so constructed that the water in both the up and down stroke will be forced centrally through the piston into the tubular shaft, G, substantially as described.

I also claim providing the piston, E, with the independent port frames, I I', and the valve, K, moving between them, so as alternately to close each in the upward and downward strokes, substantially as herein specified.

I also claim the special construction and arrangement of the piston as a whole, the same being provided with the induction passages, i i, ports, I I, valve, K, and angular space, l, substantially as described

In combination with the pump cylinder, A, side passage or pipe, B, and valves, g g' f f', I also claim the elongated passage, D, opening on one side, upward by the mouth, h, substantially as and for the purpose herein set forth.

45,800.—Musical Instrument.—George Woods, Cambridge, Mass., assignor to Mason & Hamlin, Boston, Mass.:

I claim, first, The wire coupler, K, running diagonally from key to key of any chord, having bent arms, as described, one of which is operated upon by the key played, while the other operates the other key, under a mode of construction substantially as above set forth.

Second, I also claim the movable disconnected fulcrum bar, h, constructed and operated substantially as described, to effect the construction and disconnection of the couples with the keys, as above set forth.

[This invention consists in a coupling device of a peculiar and novel construction, by which keys of thirds, fifths, octaves, and other notes, can be coupled together so as to be played by the depression of only one of the keys, by means of a movable fulcrum and connections.]

45,801.—Breech-loading Fire-arm.—Cosme Garcia Saez, Madrid, Spain:

First, I claim forming the breech chamber, as described, of one piece divided in the rear, so as to admit of contraction or expansion by the application of a suitable tightening device, as set forth.

Second, In combination with an expansible breech chamber I claim a new and actuating lever, constructed and arranged for operation for rendering the parts of the breech gas tight, as set forth.

45,802.—Bolting Mill.—Edouard H. Vittecoq, Beaumontel, France:

I claim the construction and arrangement of bolting mills, substantially as set forth, for operation in the manner and for the purpose described.

45,803.—Method of Desulphurizing and Oxydizing Metallic Ores.—M. B. Mason (assignor to C. V. De Forest, Amos Howes and Geo. Van Derburgh), New York City:

I claim my improved process for removing sulphur, arsenic, phosphorus and antimony from auriferous or other metallic ores, and for oxydizing the said ores, by treatment of them with hydrogen and carbonic acid gases, substantially in the manner herein set forth.

I claim, also, as a part of my improved process, the admission of steam into the chamber wherein the metallic ores are heated, desulphurized and oxydized, substantially in the manner and for the purpose herein set forth

45,804.—Furnace for Desulphurizing and Treating Auriferous and other Metallic Ores.—M. B. Mason (assignor to C. V. De Forest, Amos Howes and Geo. Van Derburgh), New York City:

I claim, first, A fire chamber for generating gases by the decomposition of steam therein, substantially as described, arranged in combination with a separate chamber for containing and treating metallic ores, substantially in the manner and for the purpose herein set forth.

Second, The generation of gases by the decomposition of superheated steam within a suitable fire chamber, when said gases and like products of combustion in this fire chamber are conducted into and through a separate chamber containing metallic ores, for the purpose of desulphurizing and oxydizing said ores, substantially as herein set forth.

Third, When a fire chamber for generating gases is combined with a separate chamber for treating ores substantially as hereinbefore described, I claim the introduction and use of steam in said ore chamber, for the purpose of preventing excessive heat therein, substantially as herein set forth.

RE-ISSUES.

1,844.—Apparatus for Leaching Tan Bark and Preparing Extracts.—W. H. Allen and Otis Warren, Fryeburgh, Maine, assignees of said W. H. Allen. Patented July 26 1862:

First, I claim the process herein described, of leaching bark or extracting the soluble ingredients from substances containing the same by the application to the bark or other substance of the leaching or solving liquid, in the manner hereinbefore set forth, distributing the said liquid in fine streams or spray evenly over the surface and letting it percolate into and through the mass of bark or substance until it shall become duly saturated, and keeping up the supply of liquid, as set forth, until the said bark or substance shall be exhausted, substantially as specified.

Second, I claim the herein described apparatus for leaching bark or for extracting the soluble matter from solid substances containing the same, that is to say the combination with a vat or tub of suitable form, of a false bottom and rotating distributing arm, the whole being constructed for operation, substantially as set forth.

Third, Proportioning the areas of the apertures in the rotatory distributing arm to the distance of each from its center of revolution, so that a uniform quantity of liquid shall be distributed over and through the mass, substantially in the manner set forth.

1,845.—Treating Leather.—E. H. Ashcroft, J. A. Johnson and A. S. Moore (assignees by mesne assignments of Joseph Burrill), Lynn, Mass. Patented May 3, 1864:

We claim, first, The use of gelatine in the treatment of leather after it is tanned for the purpose of improving its quality.

Second, The combination of gelatine with a solution of hemlock bark, or other substance containing tannin, and alum, substantially as described and for the purpose set forth.

1,846.—Rowlock.—J. W. Norcross, Middletown, Conn. Patented Sept. 27, 1864:

I claim, first, The use of a plate or bracket, D, with center pin, b, applied in combination with a rowlock, B, and with the gunwale of a boat, substantially as and for the purpose set forth.

Second, The flange, C, and bracket, D, either one being provided with a rim overlapping the edge of the other and applied in combination with a rowlock, B, of any desirable construction, substantially as and for the purpose described.

Third, The spring, c, applied in combination with the rowlock, B, in the manner and for the purpose substantially as shown and described.

1,847.—Preparing Barrels to Contain Petroleum, Coal Oil, etc.—Louis S. Robbins, New York City. Patented May 3, 1864:

I claim the combination formed by saturating the entire surface of the cask with oil, and the inner body of the staves and heads with an akaline solution or with soapsuds, substantially as and for the purpose set forth.

I also claim saturating the staves and heads of the casks with a strong alkaline solution or with soapsuds, as and for the purposes above specified.



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.

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 best 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

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 invention 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 think 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.

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. A., of Conn.—We do not know what the patent extract of quilling is. The "Industrial Chemist" came for a while regularly to this office, but we have not seen a copy for some time, and suppose that it has gone the way of most weekly papers.

J. J., of N. Y.—It has recently been stated in the SCIENTIFIC AMERICAN that the process of making grape sugar from starch is an old and established industry. But it is claimed that Mr. Goessling has discovered the art of making cane sugar from starch, and if this be true it is a very important discovery.

E. S. C., of Florida.—The regular differences in squares, roots, logarithms and other series of numbers, have been most laboriously examined by Babbage and others, as they form the basis for the construction of calculating machines.

W. C. S., of Ohio.—Smee's Electro-Metallurgy, published by John Wiley, 535 Broadway, New York, is an excellent treatise.

H. S., of N. Y.—The induction of magnetism in soft iron occupies an extremely minute, but appreciable period of time, and it takes time also in losing its magnetism. If your bar magnet were revolved in the circle of soft wires, it would be held back by the magnetism lingering in the wire that it was leaving, while there would not be an equal force yet generated in the wire that it was approaching.

C. H. B., of Pa.—You can make a good soft solder for patterns of tin and lead in the following proportions:—tin, 8 pounds; lead, 5. If the patterns fuse or melt with this, make them a little harder, or don't apply the iron too hot. We do not know of any cold solder for this purpose.

J. C. G., of N. Y.—If we understand your question, you have an air-tight tank filled with water and connected by a pipe with an empty air-tight boiler beneath; and you want to know whether the water will run from the tank down into the boiler. If the pipe is large enough for the air to pass up at the same time that the water is passing down, the water will run down; but if the pipe is so long that the end of it will be covered by the water rising in the boiler, the flow will cease.

Money Received

At the Scientific American Office, on account of Patent Office business, from Wednesday, Dec. 28, 1864, to Wednesday, Jan. 4, 1865:—

A. M., of N. Y., $25; H. H. M., of N. Y., $25 O. R. B., of N. Y., $25; E. A. H., of Del., $15; H. B. B., of Mass., $30; S. & G., of R. I. $15; J. H. P., of Mich., $25; Mrs. J. P., of Mich., $25; S. & Co., of Wis., $25; B. H., of Ill., $16; J. C. W., of Mich., $25; W. H. H. of N. Y., $15; W. F., of Conn, $25; A. M., of N. H., $16; J. A. L., of N. Y., $45; G. N. B., of Mich., $40; E. H. C., of Mich., $30; L. S. F., of N. J., $45; J. P. C., of Pa., $20; J. S. U., of N. Y., $45; R. B., of N. Y., $15; F. S. P., of N. Y., $32; F. G. S., of Mass., $20; T. M. of N. Y., $20; J. J. A., of N. Y., $15; J. A. McP., of N. Y., $30; S. O. R. of N. Y., $15; P. P., of N. Y., $20; H. B., of N. J., $30; A. M. W., of Mass., $22; C. F., of N. Y., $30; B. F., of N. Y., $12; J. B., of N. Y., $12; H. H. P., of Ill., $25; J. G. P., of Penn, $25; T G. L., of R. I., $25; S. M. F. R., of Ill., $15; T. C., of Ohio, $41; J. C. G., of N. J., $80; H. H., of N. Y., $15; J. P. E., of Ohio, $16; M. P., of N. H., $20; H. K., of Penn., $16; R. B. of N. Y., $250; F. S., of Italy, $45; L. S., of Penn., $20; J. L. C., of N. Y., $15; S. R., of Penn., $20; T & S., of N. Y., $40; W. S. N., of Conn., $20; C. M. J., of N. Y., $45; J. A. M., of Conn., $20; T. S. & W., of N. Y., $22; H. A. R., of N. Y., $15, E. M., of Ill., $20; S. G., of N. Y., $20; M. H., of Mass., $20; T. S. & W., of N. Y., $50; L. T., of N. Y., $20; E. C., of N. Y., $25; W. H., of N. Y., $25; J. W., of N. J., $15; C. H. P., of N. Y., $25; T. B. R., of Mich., $15; C. F. K., of Penn., $24; McK. & R., of Penn., $25; W. A., of Ohio, $25; C. M. G. R., of N. Y., $25; W. H. C., of Me., $15; J. B. T., of N. Y., $40; T. R., of Ill., $20; G. A. C., of Mass., $10; J. W. P., of Mo., $15; P. W. K., of Ill., $45; O. W., of Conn., $15; A. W. O., of Mich., $20; B. & P., of Mo., $20; F. H., of Ill., $40; O. R. B., of N. Y., $40; F. J., of N. Y., $20; H. D. F., of Mass., $10; D. C. S., of N. Y., $20; J. H., of Ill., $20; J. W. F., of Ill., $20; C. H. of Wis., $20; E. H., of Ind., $20; J. H., of N. Y., $45; L. A., of Conn., $30.

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, Dec. 28, 1864, to Wednesday, Jan. 4, 1864:—

A. M., of N. Y.; C. F., of N. Y.; E. C., of N. Y.; R. P., of N. Y.; H. H. W., of N. Y.; W. H., of N. Y.; O. R. B., of N. Y.; J. B. of N. Y.; F. S. P., of N. Y.; McK. & R., of Pa.; J. H. P., of Mich.; G. G. P., of Penn.; C. H. P., of N. Y.; H. H. P., of Ill.; H. B. B., of Ms.; T. W. E., of Mich.; W. A., of Ohio; E. W. S., of Wis.; H. H., of N Y.; O. M. & G. R., of N. Y.; G. D., of N. Y.; M. P., of N. H.; W. F. of Conn.

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PROPOSALS FOR ICE.

MEDICAL PURVEYOR'S OFFICE, WASHINGTON, D. C.

Sealed Proposals will be received at this Office until January 25, 1865, for furnishing ICE to the Medical Department of the Army, at the points herein designated. The Ice to be stored by the contractor in properly-constructed ice houses at each point of delivery, on or before the 15th of April next; the ice not to be receipted for until its quality, the fitness of the ice-house, and the manner in which it is packed shall have been approved by a medical officer, and payment will be made only for the amount thus actually stored and receipted for.

The proposals will be made for the quantities indicated below as required at the respective places, with the proviso that should more be needed at any time for the year's supply, it shall be furnished at the same rates and under the same conditions.

QUANTITY TO BE DELIVERED AT

Annapolis, Md., ice-house, owned by the United States	150 tuns.
Point Lookout, Md., ice-house owned by the United States	200 tuns.
Fortress Monroe, Va., ice-house owned by the United States	280 tuns.
Portsmouth, Va., ice-house not owned by the United States	100 tuns.
Newbern, N. C., ice-house not owned by the United States	400 tuns.
Hilton Head, S. C., ice-house owned by the United States	450 tuns.
Beaufort, S. C., ice-house owned by the United States	300 tuns.
Savannah, Ga., ice-house not owned by the United States	400 tuns.
Pensacola, Fla., ice-house not owned by the United States	100 tuns.
Mobile Bay, Ala., ice-house not owned by the United States	100 tuns.
New Orleans, La., ice-house owned by the United States	500 tuns.

Proposals will also be received for furnishing Ice, daily by weight, for the year 1865—in such quantities as may be required by the Surgeons in charge—at United States General Hospitals, at the places enumerated above, and upon the following annual estimate, in and near:—

Boston, Mass	10 tuns.
Portsmouth Grove, R. I	130 tuns.
New Haven, Conn	60 tuns.
New York	800 tuns.
Newark, N. J	100 tuns.
Philadelphia, Pa	1,300 tuns.
Baltimore, Md	200 tuns.
Frederick, Md	75 tuns.
Washington, D. C	2,500 tuns.

All additional amounts that may be required at these places until January 1, 1866, are to be furnished at the same rates.

FORM OF PROPOSAL.

The undersigned proposes to furnish —— tuns of first quality Ice, carefully packed in substantial ice-houses, at the within-named points, namely: ——, at the following price per tun of two thousand pounds, namely: at —— —— —— —— tuns, at $—— per tun.

The Ice to be subject to the inspection, measurement and approval of a Medical Officer, or other properly-appointed inspector, before being receipted for.

Payment to be made from time to time upon duplicate bills certified to by the Medical Director.

(Signed) —— ——.
—— ——.

FORM OF PROPOSAL.

The undersigned proposes to furnish daily, or otherwise, all the Ice required for the hospitals, upon approved requisitions of Surgeons in charge, at or near the within-named points, at the following price per hundred pounds, namely: —— —— —— —— $—— cents per hundred pounds.

The Ice shall be of the best quality, and subject to the approval of the Surgeon in charge, who shall receipt for the actual amount delivered at each hospital.

Payment to be made from time to time upon duplicate bills, certified to by the Medical Director.

(Signed) —— ——.
—— ——.

The above form of proposals will be adhered to as closely as practicable. Other forms will be received by the Department and duly considered.

A proper guarantee that the bidder is able to fulfil the contract, certified to by the Clerk of the nearest District Court, or a United States District Attorney, must accompany the proposal, or it will be rejected.

An oath of allegiance to the United States Government must also accompany the proposal.

The contracts will be awarded to the lowest responsible party or parties, who will be duly notified by mail or otherwise that their bid is accepted, and immediately required to enter into contract under bonds to the amount of $5,000. The bonds must be properly certified, and the post-office address of principals and sureties stated upon them.

Bidders may be present in person when the proposals are opened.

The post-office address of the parties proposing must be distinctly written upon the proposal.

Proposals must be addressed to "Surgeon Charles Sutherland, U. S. Army, Medical Purveyor, Washington, D. C."

The Department reserves the right to reject any and all bids deemed unsuitable.

CHARLES SUTHERLAND,
Surgeon U. S. A. and Medical Purveyor,
Washington, D. C.

Printed forms of proposal may be had at this office. 3 3

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Improved Curtain Fixtures.

Very great annoyance has been caused by the common cord-and-roller fixtures for curtains, and the catch over which the cord passes at the bottom. This slide is very insecure, and constantly getting out of order. Its appearance is also objectionable in many places. The fixtures herewith illustrated have no side catch to get out of repair, and are self operating so far as rolling up the curtain is concerned. They are simple in principle, and the model before us works very well; they will doubtless give satisfaction wherever introduced. The following description will render the details intelligible to our readers.

The roller on which the curtain is fastened is a tin tube, A, having a spring, B, see fig. 3, coiled inside.

Fig. 1



HARTSHORN'S CURTAIN FIXTURES.

Fig. 1 shows this tube and also the manner of fastening the curtain to it. A groove is made in the roller, which has a thin flange, a, overlapping it. The edge or top seam of the curtain is then wired as at *b*, placed in the groove, and the flange turned over it, where it is firmly held in its place.

The end of the roller is hollow and fits over a journal, D, cast on the bracket, E. The roller has further a boss, F, see fig, 2, on the end, in which there are recesses, G. In these latter the pawl, H, fits, its other end being jointed to the bracket.

Fig. 2

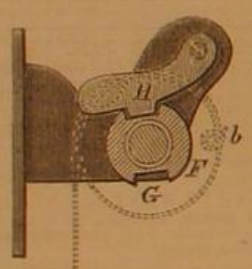
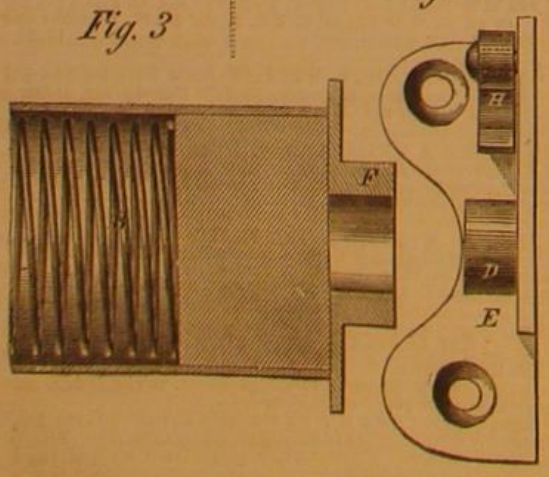


Fig. 3

Fig. 4



The operation of these details is as follows: When the curtain is rolled up, by grasping the tassel usually placed on the bottom it may be pulled down to any point; the pawl, H, falls into the recess on the roller and holds it in place. When it is desired to elevate the curtain, a slight pull causes the pawl to slip out of the recess, and the spring, B, then exerts orce, and winds the curtain upon the roller, It is therefore possible to fix the shade at any hight and retain it there without the use of cords or catches on the window frame. A patent was procured on this arrangement through the agency of the Scientific American Patent Agency, Oct. 11th, 1864, by Stewart Hartshorn; for further information address him at N. W. corner of Fourth avenue and Tenth street, New York City.

Utilising Refuse Tin.

Some improvements in treating and utilising refuse tinned iron and other combined metals has been provisionally specified by Mr. N. O. Andre, of Paris. He proposes to subject the cuttings to the action of nitrous or nitric vapors, or any other gaseous acids, with a view to the re-employment of the metals, especially tin, such scraps forming the refuse of various existing manufactures or products. The metal refuse is first poured into a vertical column from five to ten yards in hight, and of a size proportionate to the amount of products to be treated. This column is divided into compartments of about fifteen inches in depth by means of wood divisions moving in a horizontal plane. The metal is put in at the top of the column, care being taken to introduce the wood divisions above each compartment when filled, so that the total weight of the metal shall not rest on the bottom but be divided into as many fractional parts as there are compartments. The acid vapors are then introduced at the lower part of the column (nitrous vapors for example), and on the other hand steam is introduced at the same point, which becoming partially condensed renders humid the substances contained in the column. The gaseous acids oxidise the surface of the refuse metal and ultimately attack the iron, and this action is allowed to continue in order to ensure the oxidation of all the foreign metals, and when the operation has sufficiently advanced the bottom compartment of the chamber is emptied, and the divisions above mentioned successively withdrawn from the bottom upwards, so as to empty the contents of each compartment into the next below it which has become vacant, while the upper one is charged with a fresh quantity of materials. The refuse, which is now covered with a pasty oxide, is washed in several waters and sorted, while if there be any oxide still adhering it is again washed in acidulated water and then rinsed. The sorting is effected with greater or less care according to the purpose for which these cleaned iron scraps are intended. The acids are reduced and melted in a crucible enveloped in charcoal in the ordinary manner. In order to obtain the tin in a perfectly pure state the oxide is washed in nitric and acetic acids. If the metal scraps have been treated by means of the vapors of hydrochloric acid with a view to obtain the whole or part of the tin in the state of protochloride or bichloride it may be precipitated in a metallic state by means of zinc. The iron scraps or solder which may have been imperfectly deprived of tin or other metal are introduced a second time into the column, or they may be employed in chemical operations where the presence of small quantities of lead or tin is not prejudicial.—*London Mining Journal.*

CARE OF THE HEALTH.—"A man had better break a bone, or even lose a limb, than shake his nervous system. Lord Coke requires only eight hours' application per day, for a student of the law, and Sir Matthew Hale thought six as much as any one could bear; eight, he said, was too much."

A Plan for Accelerating the Speed of Paddle Steamers.

A foreign contemporary says: A series of experiments have recently been made with a working model, fitted with a pair of two-bladed screws or fans, working amidships in the place of ordinary paddles, with results of 60 per cent in favor of the fans with the boat empty, and 30 per cent when heavily laden with stone. The same boat was employed in testing the two powers, by removing the paddles from the axles and putting the fans in their places. Mr. George Ellis is the inventor.

[It is very curious to see how inventions repeat themselves, and what extraordinary results are obtained in experiments that vanish in practice. The same plan was tried here on Lake Erie and the Hudson River some years ago but was a total failure, as any engineer could have predicted.—EDS.

THE new gunboat Suwanee, built by Redney, Son & Archer, at Chester, Pennsylvania, on her trial trip, on Friday, made sixteen miles in fifty-five minutes, or about eighteen knots an hour. She is a "double-ender."

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this latter department being very full and of great value to Farmers and Gardeners; articles embracing every department of Popular Science, which everybody can understand.

PATENT LAW DECISIONS AND DISCUSSIONS

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Vol. XII.—No. 4. (NEW SERIES)

NEW YORK, JANUARY 21, 1865.

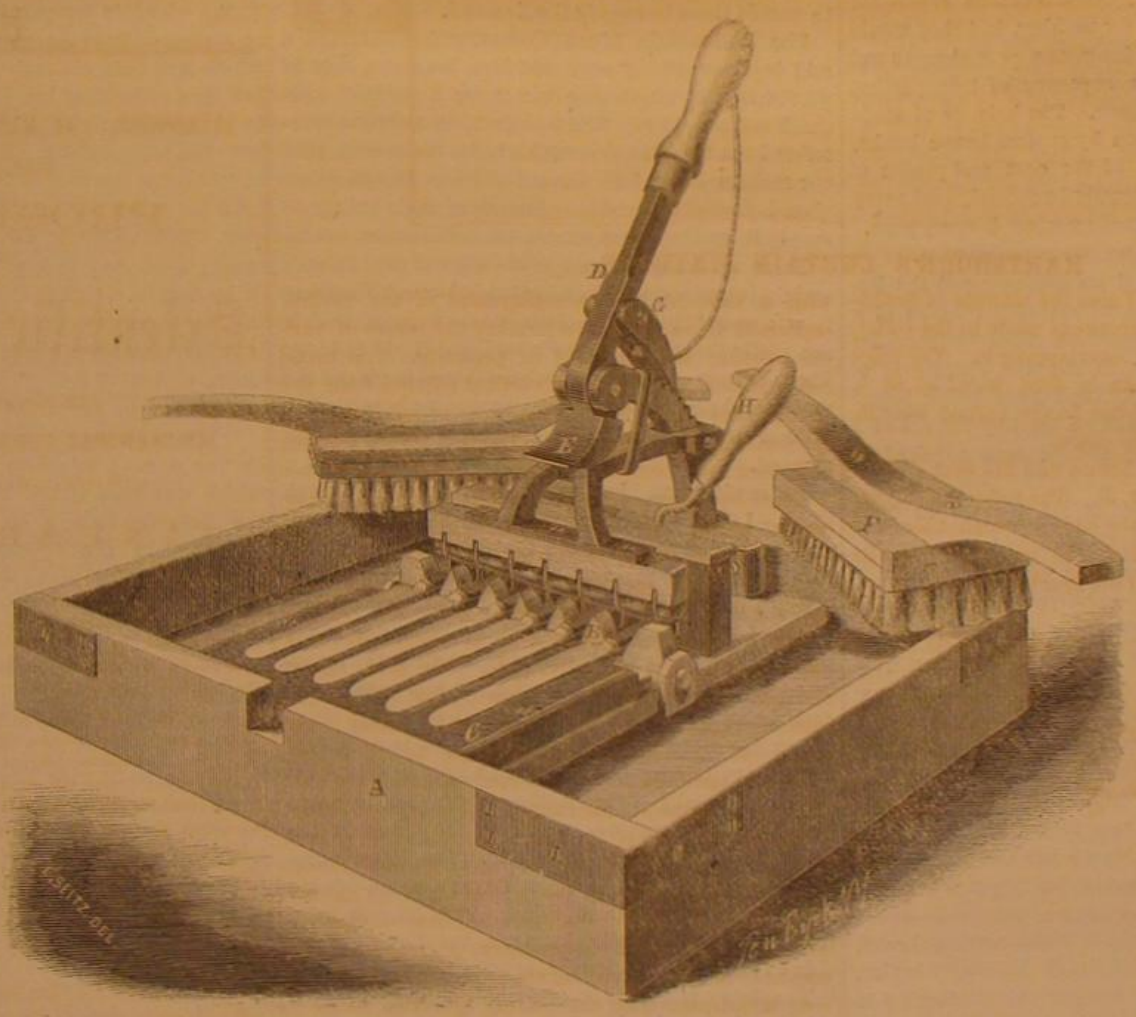
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This knife cleaner is intended for hotels, steamboats, boarding-houses, saloons, or large private families, where many knives have to be cleaned in a short time. It is now in use in most of the city hotels and large restaurants, and is certified by the proprietors of them to be a very excellent machine. It cleans from six to a dozen knives at once, according to size of machine, in a very superior manner. The machine consists of a box, A, for holding the knife frame, polishing powder, and brushes. The knife handles are placed in stocks, B, and have their blades resting on a cushion, C. The lever, D, is then brought forward, and by means of the cam-shaped toe, E, it holds the handles firmly while the blades are being polished. This latter is effected by the brushes, F, seen at the side. One of them is for applying moist polishing materials, if necessary, and the other for giving the final luster. The pawl, G, catches in the rack, H, and holds the lever up so that the knives cannot slip while being operated on.

When one side of the blades has been thoroughly cleaned, a movement of the handle, H, reverses them, so that the other side is in position to be cleaned.

This machine is durable and strongly made, and large numbers of them are now in use. It was patented on the 27th of January, 1863, by Geo. Weedon, of this city. For further information address him at 383 Sixth avenue, New York.



WEEDON'S KNIFE CLEANER.

The Corn-sugar Patent.

In the list of patents issued during the week ending Dec. 20, 1864, is one to F. W. Goessling, of Buffalo, N. Y., the claim of which is in these words, "I claim a new and improved compound sugar made by a combination of cane sugar or cane sirup with corn sirup, substantially as set forth,"

It has been claimed for Mr. Goessling that he had discovered the art of converting grape sugar into cane sugar. This would have been a great discovery. But if his invention is no more than the above claim —the sweetening of grape-sugar sirup with ordinary sugar—we are unable to perceive its great magnitude. Perhaps more important discoveries are yet to be made. We shall watch with interest for further developments in this new sugar enterprise, which, in importance, if half be realized that is claimed for it, is hardly equalled by the Petroleum interest.

Long Bearings and Large Valves.

The engines for the new fast frigates building by Government are of unprecedented dimensions for machinery of their design. The cylinders are two in number, horizontal, 100 inches diameter, and 4 feet stroke.

The bearings of these engines are unusually long, being in diameter 18 inches, and in length 4 feet. The engines have slide valves of immense weight and area; deprived of the steam pressure alone the mere stopping and starting of these valves thirty or forty times in a minute is an enormous waste of power. The valves have steel rollers under their bottom edges, and under the steam face, to relieve the excessive friction. A pair of car wheels ten or twelve feet in diameter would materially aid in reducing the friction but rollers under the faces would seem difficult to regulate so as to be beneficial.

Petroleum Stock Swindle.

Since our recent expose of the oil stock swindle the ardor for investment in that direction appears to have cooled off to a considerable extent. The people are beginning to realize that the windy prospectuses of Petroleum Companies are nothing more than cunningly contrived traps in which to catch the unthinking multitude. A journal published in this city, representing the petroleum interests gives a list of several Companies as being entirely worthless whose aggregate capital amounts to six million dollars.

The dupes who have fallen into these traps ought to have the schemers indicted by the Grand Jury for swindling.

The Erie (Pa.) *Dispatch* sharply denounces the bogus oil Companies and oil speculation in that section. It claims that correspondents writing to some New York papers furnished lying reports of oil discoveries, and modestly claim to be the only reliable exponent of the business interests of the oil country of north-western Pennsylvania.

Cotton Cultivation in the West Indies.

Hunt's Merchant's Magazine says :—

"A company has recently been formed in this city styled "The American and British West India Cotton Co.," which has leased for a term of years 2,000 acres of land, on Long Island, one of the group of Bahamas, situated in latitude 23° 10′, longitude 75° 3′. This island, it will be remembered, is 100 miles long, from 5 to 7 miles wide, and from 50 to 75 feet above the level of the sea, and no climate in the world is more healthy or better adapted for invalids. The average temperature is 80°, never rising above 85°, while the land is said to abound in springs of the best kind of water, which is obtained by digging from five to fifteen feet. Previous to the year 1835, it was settled by cotton-planters with their slaves, and thousands of bales of Sea Island cotton were annually exported to Europe. When slavery was abolished, the culture of cotton ceased, and almost the whole of the white population emigrated to other countries, leaving the land to the freed blacks, who employed their time in making salt.

During the past two years, several persons have had a portion of the land cleared, and have raised a small quantity of cotton, the quality of which is claimed to be superior to any raised on the coasts of Georgia and South Carolina, selling here at higher prices than the best Sea Island cotton raised in this country. Estimates of the cost of raising place it at ten cents (gold) per pound, and an acre with good cultivation will yield four hundred pounds.

This company has been formed for the purpose of cultivating this land, and, to relieve themselves from the difficulty of procuring laborers, have sent a number of men from the United States, who will always be in their service. The company feel sanguine that, with careful management, the original cost will be below the above estimates; and should peace once more reign in our country, and everything be reduced to its former standard, the prospects of the company will be no less favorable, as the quality of cotton raised on the island always sold at sixty cents per pound.

English Balance of Trade.—*Blackwood's Magazine* says that last year the exports from Great Britain amounted to 160 millions sterling, and the imports to 280 millions. Every nation must have what is called a balance of trade against it every year.

Hall's Journal of Health, a monthly periodical, containing useful information on various subjects, is published at No. 12 Union Square, New York, for $1 50 per year.

POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

The Association held its regular weekly meeting at its room at the Cooper Institute, on Thursday evening Jan. 5, 1865, the President, S. D. Tillman, Esq. in the chair.

The President remarked that as it was the beginning of the year he would read, in place of the usual summary of scientific news, some statistics of the annual trade and industry of the country. A statement that our exports exceeded our imports led to a brief discussion on—

THE BALANCE OF TRADE AND THE CUSTOM HOUSE BOOKS.

Mr. Adriance explained that at our custom houses the imports are entered at their cost in specie, and the exports at their cost in paper. Reducing the exports to their specie value there would be a balance of trade against us to the amount of $80,000,000.

Mr. T. Smull remarked that this was a good thing, it shows that our commerce is profitable to the country. If our imports were not of more value in our markets than the exports, our merchants would not merely be doing business for nothing, but they would also be losing the freight, insurance, port charges and all of the other enormous expenses of transporting merchandise over the ocean. The balance of trade against a nation, as shown by custom house books, is simply an expression of the cost and profits of commerce. Trade is mutually beneficial, and every nation has a balance of trade against it every year.

A SPECIMEN OF MICROSCOPIC ENGRAVING.

The President exhibited an engraving of the Declaration of Independence, of precisely the size of a silver dime. It was engraved on steel by hand for the Bank Note Company. It had the signatures of the drafting committee only, and these, being larger letters than the body, could be read by the aid of a good eye-glass; but a microscope was required to read the remainder

The President next called on Mr. Watson to open the regular subject of the evening—

THE MANUFACTURE OF THEEAD.

Mr. Watson:—Mr. President—To the people of this country at large, the importance of a good sewing thread is very great. Until a few years, almost from the commencement of the war, English thread controlled the market, but within the time spoken of a vast trade has sprung up, involving tens of thousands of dollars of capital and giving support to hundreds of persons. There are, at this time, in this country, many thread mannfacturers, and the aggregate value of the mannfactured product amounts to $4,000,000 annually. The number of yards made is incalculable.

The necessary qualities in a good sewing thread, are strength, smoothness of finish, regularity in size, rotundity, freedom from knots, and uniformity in the quality. All these are obtained in our best American threads. I have been at some pains to obtain the leading threads in the market, and I have brought here, for your inspection, the Willimantic thread; the Green & Daniels thread and the Stafford Bros. thread. In addition to these there are other threads made. Perry's Water-twist, Samoset, Shaker's, and Circassian, are well known brands.

I have here also an English thread of Coats, and another one whose name I shall not give; the latter I submit for your examination. [The speaker here handed around an English thread which was very inferior.] Coats English thread is justly celebrated, it has been in the market twenty-five years and is uniform in quality; I think, however, that our domestic thread is, in all respects, superior. In the matter of strength I will make a simple test. I have here a spool of Coats's six-cord cotton and one of the Willimantic Linen Company. They are both of the same number—twelve—and both are taken indiscriminately from a dealer's stock in a store. I have but little faith in public experiments, for like spoiled children, they seldom show to advantage, nevertheless I will tie both together at the same length and see which will break first. [The speaker here tried the experiment, which resulted in the breaking of the English thread.] This accords with private experiments to determine the same thing. I took weights and applied them to a suspended Coats thread. When it broke I took the same weights and applied them to an American thread, which not only sustained them, but twenty-five per cent additional weight, without breaking.

I have heard it asserted that a glazed thread will lose its strength after the size has been washed off. I tried an experiment to determine this also, and saw no difference whatever, although I think it is possible to wash any glazed or unfinished thread for sinister purposes, so that the fibers will be dissolved or torn apart, and the strength destroyed.

I have here an American thread made by Messrs. Green & Daniels, and one made by Stafford Brothers; that of Messrs. Green & Daniels is styled "ivory finish," that of Stafford Brothers "enameled thread." Both of these threads are first class goods. They are 200 yards spools, four-cord threads and warranted to be as represented. They are now widely used, and manufacturers have told me that they used American black glazed thread in making silk cloaks, it being cheaper and as durable for their purposes as silk thread itself. I am also informed that three-fourths of the thread now in use is American thread, and our manufacturers are putting up extensive works to enable them to supply the demand.

The Willimantic Linen Company have erected a mill in Connecticut over 400 feet long at a cost of $1,000,000, in which they will make a six-cord soft-finish cotton. Very little soft-finish cotton has heretofore been made in this country, for the reason that our makers have had from 75,000 to 80,000 dozen glazed thread ordered in advance of their ability to supply it, so they were unable to make other kinds.

There are many persons who dislike glazed thread, and the introduction of it was attended with difficulties. It was asserted that the cloth was cut by it, that it ran stiffly through the needle and was liable to kink. These defects are apparent where thread is glazed too much, and experience has shown our makers that a little or medium sizing is preferable to a greater amount.

For sewing machine use glazed thread is much liked. I have questioned many sewing-machine operators, and they assure me that what I have stated to this meeting previously, is correct. In my own family I have been in the habit of using the Willimantic Linen Company's thread, and I may here say that I was led to examine the subject from the excellence of that article. I therefore do not speak from casual acquaintance but from actual test.

Our American cottons, at least that variety last named, are four-cord. From No. 40, up, the Willimantic cotton, and I presume the others also, is made from Sea Island cotton, which is the finest in the world for that particular service. The lower numbers are long staple, Gulf, or Texas cotton. Some cotton from Pernambuco, South America, has been tried by the Willimantic Company, but they were unable to use it, and suffered loss from the experiment.

The sizing of thread is commonly supposed to be starch. It is not. What it really is, the manufacturers know best. That is one secret which I cannot disclose. I am able to inform you, however, that one firm used an article called salep procured from Turkey. I have never seen any salep, but am told that it is exceedingly hard and almost vitreous in its nature, and one of the most difficult substances to grind known to man. It will destroy a French burr mill stone, and is, if my informant did not tax his imagination too highly, a most remarkable article. In the place of this salep, five ingredients are used, but of the nature and proportions of them I am ignorant. A sized thread is more costly and troublesome to make than soft finish.

English manufacturers are now putting up a mill in New Jersey, which they intend to stock with English operatives, for the purpose of competing with American makers.

From what I have said it will be seen that American thread is, in all respects, equal to the imported. I am unable to see why it is not better; for my own use I prefer it to English. It is certainly cheaper, for the best American threads can be bought for $1·10 to $1·15 per dozen, where the foreign-made costs $1·50. If it be urged that the duty on the latter is great, I present for your consideration the war tax of our makers, which is, I am sure, quite as onerous.

If it be a fact that American thread enjoys a monopoly of 75 per cent of the trade, I hope the time is not far distant when it will absorb the remaining 25 per cent, and retain the home trade for home makers.

PROF. RANKINE ON THE DENSITY OF STEAM.

After the completion of Messrs. Fairbairn and Tate's experiments on the density of steam, a full account of which has been given in the SCIENTIFIC AMERICAN, a paper was read before the Royal Society of Edinburgh, by W. J. Macquorn Rankine, C. E., LL.D., F. R. SS., the object of which was to draw a comparison between the results of the mechanical theory of heat and the results of the experiments. For a copy of this paper we are indebted to the author. He deduces the general equation of thermo dynamics from the "hypothesis of molecular vortices," otherwise called "the centrifugal theory of elasticity," and shows that this equation gives results coinciding almost precisely with those of Fairbairn and Tate's experiments. The following extracts from the paper may interest a portion of our readers.

ABSOLUTE COLD AND ZERO OF GASEOUS TENSION.

"These symbols have the following meanings:—T, the absolute temperature of an elastic substance as measured from the *zero of gaseous tension*, a point which was then estimated to be at 274°·6 Cent. below that of melting ice, but which is now considered to be more nearly at 274° Cent., or 493°·2 Fah., below that temperature. K, a constant, expressing the hight on the thermometric scale of the temperature of total privation of heat above the zero of gaseous tension. This constant was then only known to be very small; according to later experiments it is either null or insensible. C, the absolute temperature of melting ice, measured from zero of gaseous tension (that is to say, according to the best existing data, C=274° Cent., or 493°·2 Fah.)"

DENSITY OF STEAM AT VARIOUS TEMPERATURES.

"The experiments of Messrs. Fairbairn and Tate on the density of steam are described in a paper which was read to the Royal Society of London, as the Bakerian lecture, on the 10th of May, 1860, and published in the 'Philosophical Transactions' for that year. The results of those experiments give what is called the 'relative volume' of steam; that is, the ratio which its volume bears to that of an equal weight of water at the temperature of greatest density, 39°·1 Fah.; but in the following table of comparison, each of those relative volumes is divided by 62·425, the weight of a cubic foot of water at 39°·1 in lbs., so as to give the volume of one lb. of steam in cubic feet. The numbers of the experiments are the same as in the original paper; those made at temperatures below 212° being numbered from 1 to 9, and those made at temperatures above 212° from 1′ to 14′.

No. of Experiment.	Temperature Fahrenheit.	Volume of 1 lb. of Steam in Cubic Feet. By Theory.	By Exper
1.	136·77	132·20	132·60
2.	155·33	85·10	85·44
3.	159·36	77·64	78·86
4.	170·92	60·16	59·62
5.	171·48	59.43	59·51
6.	174·92	55·18	55·07
7.	182·30	47·28	48·87
8.	188·30	41·81	42·03
9.	198·78	33·94	34.43
1′.	242·90	15·61	15·11
2′.	244·82	14·77	14·55
3′.	245·22	14·67	14·30
4′.	255·50	12·39	12·17
5′.	263·14	10·96	10·40
6′.	267·21	10·29	10·18
7′.	269·20	9·977	9·703
8′.	274·76	9·158	9·361
9′.	273·30	9.367	8·702
10′.	279·42	8·539	8·249
11′.	282·58	8·145	7·964
12′.	287·25	7·603	7·340
13′.	292·53	7·041	6·938
14′.	288·25	7·494	7·201

AT Carbondale, Ill., there are three cotton gins in operation, and all have been busy since the beginning of the season. Three hundred bales have been pressed there, and sent to market, all from the vicinity. Other gins are at work in the county.

IMPROVED METHOD OF STAKING AND IMPROVMENT IN CURING HOPS.

At the last meeting of the Farmers' Club Mr. F. W. Collins, of Morris, Otsego County, New York, gave a very interesting description of the present mode of raising and curing hops, with an account of some important improvements which have recently been made in both processes. We present a summary of his remarks.

PLANTING AND CULTIVATING.

More hops are raised in Otsego county than in any other county in this state or country. The vines are planted in rows eight feet apart both ways. They are propagated by layers; a long vine is laid down, and in the course of the season it throws out roots from each joint, these are cut and planted in the hills. The first season the ground is also planted with corn or potatoes, no crop of hops being expected, though sometimes 200 lbs. are gathered from an acre. The second season each hill is staked with two poles, 20 or 25 feet high, no other crops are planted between the hops, and the ground is kept light and free from weeds by means of a horse cultivator. The second season about two thirds of a crop is obtained, and the third season a full crop.

PICKING.

The principal labor in raising hops is the picking, and this is usually done by women and children. The harvest season commences about the last week in August. The vines are cut off at the surface of the ground; a strong man, by means of a properly prepared lever, heaves the pole from its hole in the earth, and carries it to a large box that will hold several bushels. Here the girls pick the hops from the vines, and put them into the box. The price paid for picking is from four to five cents per bushel, and a bushel will yield about two lbs. of dried hops. A smart girl will pick 30 bushels a day.

KILN DRYING.

The hops are taken from the field directly to the kilns where they are dried. The kilns are simply wooden buildings. A floor is prepared by laying slats about two inches wide, with spaces between them of the same width and covering them with a carpet of strong cloth, loosely woven so that the air may pass freely through it. The hops are piled on this cloth to the depth of from 12 to 20 inches, and they dry in the course of ten hours. It is found best to have the floor 10 feet or more above the stove and heating pipes below. As the hops immediately over the slats are protected from the drying action of the heat, it is necessary to stir them with a rake when they are partially dried. When the drying is completed the hops are pushed from off the end of the carpet, and drop a few feet upon the cooling floor; when they are put into bags, and they are then ready for market.

IMPROVED MODE OF STAKING.

Within a few years a new plan of staking has been adopted, and it is working a revolution in the cultivation. In place of having poles 20 or 25 feet high, we set them only eight feet, and connect their tops in both directions by strings of strong twine, along which the vines are trained. The most important effect of this plan is avoiding the necessity of cutting off the vine at the time of picking. When vines are cut so early they bleed profusely, and this bleeding seriously injures and sometimes destroys the root. With the low stakes the strings are loosened at the top, when the vines slide down within the reach of the pickers. The top of the vine dies in the course of the winter, but the root escapes the great damage from bleeding. This increases the crop the next season. By the long pole system a crop was obtained ranging from 700 to 1200 lbs. per acre, but by the new system it is not uncommon to get 1500, and even 2000 lbs. to the acre.

IMPROVED PLAN FOR DRYING.

The value of hops depends upon the proportion of lupalin which they contain. The more they are stirred in the process of drying, the more of this fine dust is shaken out and lost. We now prepare a drying floor by stretching a series of No. 10 wires across the room, and spreading the carpet smoothly upon them. The wires do not intercept the heat, and the hops require no stirring. The carpet is secured to a roller at the delivering end, and when the drying is completed, the roller is slowly turned so as to wind up the carpet upon it, thus drawing the hops quietly along without shaking them in the least. By this plan we get hops of very superior quality.

SIX ACRES OF HOPS DESTROYED BY LIGHTNING.

Solor Roolinson inquired if a plan was not patented for substituting wire for poles in training hops. Mr. Collins replied, "Yes, the plan of Mr. Aylesworth. He set large beams, like telegraph posts at the sides of the field and stretched wires across. Pieces of twine were then led down from the wires vertically to the hills. The plan was introduced in a number of fields. It had some advantages and some disadvantages. One difficulty was the liability of electricity to run along the wires. I knew of one field of six acres which was struck by a flash of lightning, and it went over the whole field, completely killing the tops of all the vines."

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 Pocket-book.—This invention consists in the application of one or more strips of spring steel to the closing flap of a pocket-book, said strip or strips being secured in the edge or edges of the flap, in such a manner that by its action the pocket-book is kept closed without the aid of the usual clasps, strings, or other fastening, and if a portion of the pocket-book is unfolded or opened, the remaining pockets are still closed by the action of the spring flap, and their contents prevented from dropping out accidentally, and an article is produced of great convenience. It is capable of holding bills or papers of value of any description, and the danger of losing a portion of its contents is considerably lessened. J. Fred. Dubber, of the firm of Dubber & Martin, No. 160 William street, New York, is the inventor.

Adjustable Stake Holder for Railroad Cars.—This invention relates to a new and improved holder for securing stakes to the sides of flat and sideless railroad freight cars. The object of the invention is to obtain a holder for the purpose specified which will admit of the stakes being adjusted or turned down in a horizontal position when required, so as to obviate the necessity of detaching or removing the stakes from the car at any time when an upright position of them is not required, as in loading and unloading a car, etc. By this means the stakes, not requiring to be detached from the car at any time, are not liable to be lost or mislaid, are always ready for use when required, and in case of breakage new ones may be readily applied. A. R. Burdick, of Racine, Wis., is the inventor.

Harness or Gig-saddle Tree.—This invention relates to an improvement in that class of harness or gig-saddle trees which are of iron and provided with wire jockeys. The object of the invention is to do away with nuts and all projections whatever, at the under side of the tree, which would have a tendency to injure or "gall," as it is technically termed, the horse's back, and at the same time have the bearings of the tree so formed or constructed that they will serve the double function of bearings and clamps and afford ample room for the back band and flaps, and admit of the saddle having a chaste and neat appearance. Samuel E. Tompkins, Newark, N. J., is the inventor.

Composition for Lining and Coating Articles of Wood, Stone, &c.—This invention relates to a composition, the principal object of which is to render petroleum barrels or packages perfectly tight, and prevent the loss by leakage, but which can also be used for lining or coating other vessels or articles. This composition is made of glue and other articles mixed therewith in such a manner that the same readily adheres to the wood and is not liable to scale or crack when the barrels are roughly handled, or exposed to the heat of the sun, or when the hoops are driven. It has been applied with perfect success to petroleum barrels so that they can be shipped to any part of the globe without the loss of a particle of their contents. The materials from which this composition is made are cheap, and can therefore be furnished at a small expense. Henry Preuss, 61 Cedar St., N. Y., is the inventor.

Apparatus for packing Tubes and Joints.—This invention consists, in general terms, in a novel method of packing the tubes of oil and other wells, or any other surfaces fixed or movable, by the use of a packing box whose body is made of flexible or elastic material which is made to act as a packing by means of the expansion of its walls. Samuel L. Fox, 924 Chestnut Street Phil., Penn, is the inventor.

Wire Fence.—This invention relates to a wire fence in which each section is constructed of one or two continuous pieces of wire extending over four sets of pulleys, two of which sets have their bearings on the end posts of the section and the other two sets on adjustable posts in the middle, in such a manner that by moving said adjustable posts towards or from each other the tension of the wire is decreased or increased and such tension will thus be readily accommodated to the existing temperature; and furthermore, by using a a continuous strand of wire the liability of the wire to break is materially reduced. The several strands of wires are supported and held parallel by brackets with oblique slots, cast or otherwise rigidly attached to posts which may be loose or fastened down to the ground; before the wires are strained, they can be easily introduced into the bracket, and by moving the movable posts an opportunity is obtained to force the wire apart when a person desires to pass through between them. The bearings of the pulleys are also cast solid with the posts so that the fence can be made cheap and durable. J. W. Norcross of Middletown, Conn., is the inventor.

New Mordant.

A new mordant, for aniline and other dyes, is said to have been discovered. It consists of acetate of aluminum and arsenitate of soda, and the discoverer, M. Shultz, believes that it is destined to replace albumen, gluten, tannin, and other matters employed for the same purpose. He mixes, at the ordinary temperature, four grammes of the aniline violet of commerce, in powder, with a quarter of liter of acetate of alumina, and twenty grammes of arsenitate of soda, thickening it with starch boiled in water—the quantity of starch to be diminished in proportion to the darkness of the color to be fixed. In the case of prints, it is recommended to mix the arsenitate of soda and the acetate of alumina with the coloring matter, and to steam the fabric or yarns over the mixture. For dyeing it is said to be better to treat the tissue, or yarns, in the first place, with a mixture of the two salts, and afterwards to dip them in the color vat in the ordinary way. Salts or compounds of tin, combined with alumina, may be used instead of arsenical acid.

Fast Firing.

At Shoeburyness, the Armstrong and Whitworth Committee fired 100 rounds rapid fire from the Armstrong 12-pounder breech-loader field gun. There was an interval of 10 minutes after the first 50 rounds. The time, as taken by the committee, was —for the first 50, 6 min. 58 sec., and for the second 50, 6 min. 35 sec.; 13 min. 33 sec., in all. Thus the gun was fired throughout the 100 rounds at the rate of 7½ rounds a minute; and for the second 50 rounds at the rate of 8 rounds a minute. *It was supposed on the ground that four shots were often in the air at the same time.* This is by far the most rapid artillery fire on record, and it is more than twice as rapid than ever has been accomplished by any muzzle-loading gun. No water was used, nor any sponging, nor did any hitch of any sort occur. At the 52nd round the lanyard that pulls the friction tubes broke; this caused a delay of 20 seconds.—*London Artizan.*

Edward Everett.

The Hon. Edward Everett, died of apoplexy at his residence in Boston, on the 15th inst. His age was about 71 years. A profound and universal feeling of sadness at the announcement of his demise pervaded all classes of our citizens. The nation loses in Edward Everett not merely a talented citizen, but one distinguished for patriotism, private virtues and liberal views on all that affects the welfare of man. Mr. Everett has been successively a preacher of the gospel, professor of a college, a member of Congress, a Governor of Massachusetts, Minister to England, President of Harvard University, Secretary of State and Senator from Massachusetts; each and all of these several positions he filled with credit to himself and constituents. It is expected that high national honors will be paid to his memory.

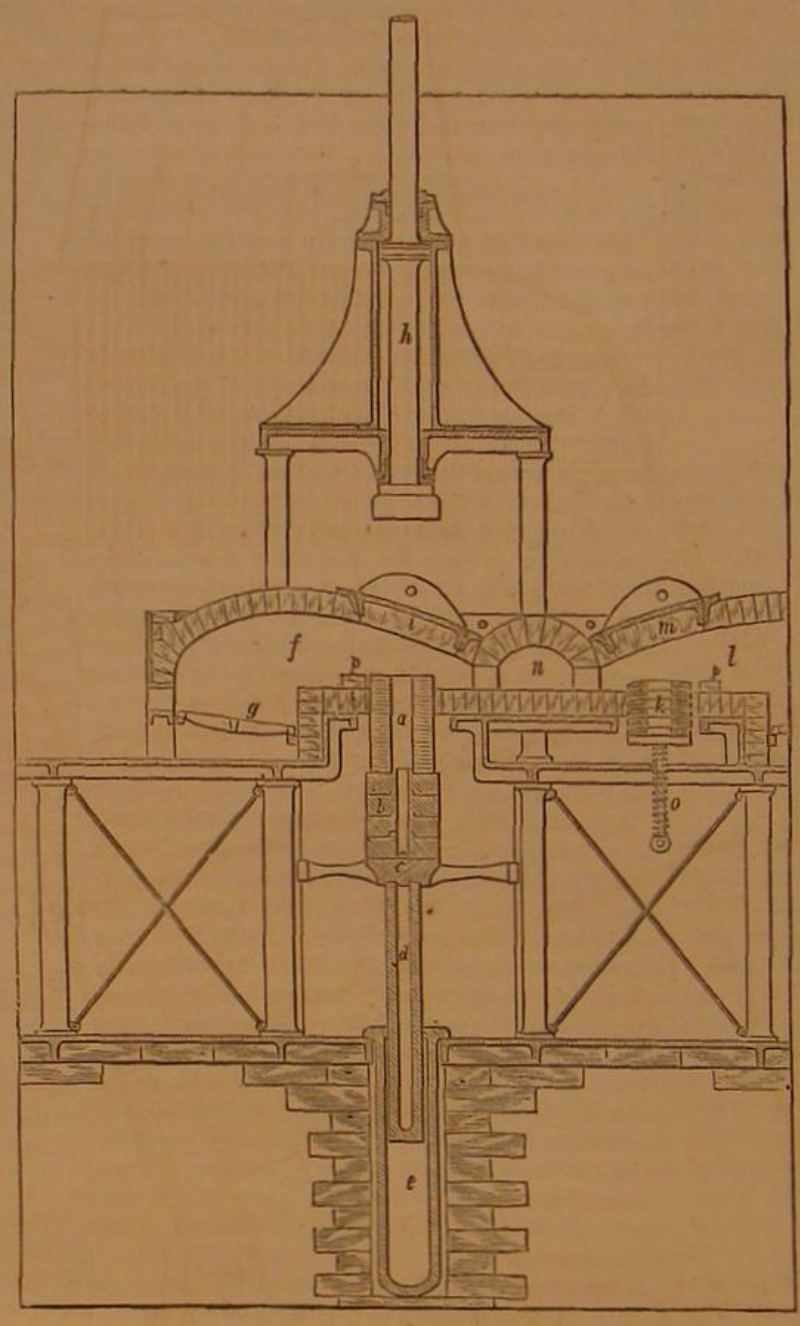
New System for Forging Cannon.

Mr. A. Hitchcock's process for forging guns is herewith illustrated and treated on by the inventor.

In all heavy forgings, as in the fabrication of large cannon and shafting, it is well understood by the practical man that no good forging can be done by a hammer that is too light to move the whole mass at every blow. If not, crystallization takes place just when this movement stops. But this theory is of minor consideration in heavy forgings. The prime difficulty being to unite a given quantity of wrought metal into a homogeneous mass. If a faggot be made up of many pieces, each piece must be heated to a certain degree before it can be welded, if no other element is introduced; but this is found impracticable even in shafting of eight inches diameter—to say nothing of forging a shaft or gun from two to five feet in diameter. Without going into details to show how large guns and shafting cannot be forged, I herewith give an illustration of a plan, whereby I can forge any number of tuns of iron or low steel (from one tun to one hundred tuns) into one homogeneous mass.

Mr. Alexander L. Holley, author of the latest book published in this country on "Ordnance and Armor," says on the subject:—

"To carry out, in the fabrication of large cannon, the principle of sound welding, Mr. Alonzo Hitchcock, of New York, proposes the system illustrated in Fig. 182. The iron is heated in a reverberatory furnace, to avoid its contact with sulphur and other impurities in coal. The gun is formed of rings of wrought iron or of low steel made without welds. The rings are so formed as to be united first in the center, that the superfluous cinder may be squeezed out. The anvil, *b*, is situated on the piston of a hydrostatic press, *e*, so as to be lowered as the successive rings, *a*, are added. The furnace, *f*, is situated between the anvil and the steam hammer, *h*, and so arranged that the rings project into it from below, and the hammer drops into it from above. The ring to form the muzzle of the gun is laid upon the movable anvil and projected sufficiently into the furnace to allow the flame to raise it to a welding heat. Meanwhile, in another part of the furnace the rings, *k*, are heated to welding in the same time by proportioning the heat, by means of dampers, to the relative bulks of the two parts. Without removing the parts from an atmosphere in which there is very little if any oxygen, they are laid together and instantly welded by a few strokes of the steam hammer. The anvil is then lowered by the thickness of another ring, and the same process is repeated. Although the gun may be of any size, the parts acually united at one operation may be made so light by reducing their thickness that the percussion of the hammer of moderate weight will be adequate. And when the whole operation of upsetting is confined to one joint, exactly the requisite pressure for that joint can be applied; and there is no fear of injuring other parts by setting it up soundly, because the mass of the gun below it is cold and forms a rigid pillar—practically a continuation of the anvil.



HITCHCOCK'S SYSTEM FOR FORGING CANNON.

"It would appear that all conditions of sound welding may thus be attained if the process can be practically carried out. The objection raised by some iron-workers that the single iron will be burned before the larger mass is heated to welding, is not well founded. Certainly the heat in what are substantially, or may be actually, two different furnaces, can be regulated with the utmost nicety. Besides, the mass is already hot before the ring to be added is put into the flame. Locating an anvil upon water is simply a question of strength of what holds the water. A screw would answer the purpose and would not be liable to disarrangement, since an accurate fit is not important, and the adjustment does not take place at the instant of the blow. Or the screw might be employed simply to elevate and depress the anvil—the force of the blow being received by blocks of varying thickness placed between the anvil and its bed.

"The mechanical difficulties do not appear to be serious, and considerable cost of apparatus is warranted by the certainty of sound work. Mr. Hitchcock's process was intended especially for fabricating guns of low steel, the wings to be made without welds, by being originally cast in form of small thick rings, and then rolled, in a modification of the tin-rolling machine, to a larger diameter and a smaller section. This treatment would develop an endless grain in the rings in the direction of the circumference. Again, very short Armstrong coils could be welded together by Hitchcock's method, thus avoiding the embarrassment of Armstrong's present process."

All that has been said of guns in the above is equally applicable to shafting. For further information on this subject call on or address A. Hitchcock, Nos. 4 and 6 Pine street, New York.

New Rock Salt Mine.—It is reported that in the new State of Nevada, beneath a thin covering of refuse saline matter, for a depth of fourteen feet, pure rock salt is found as clear as ice, and "as white as the driven snow." Beneath there is water, which seems to be filtered through it to an unknown depth. The whole of the fourteen feet in thickness does not contain a single streak of any deleterious matter or rubbish, and is ready for quarrying and sending to market. The locality is one hundred miles west of Roese river.

The meaning of the number on spools of thread is the number of hanks to the pound; each hank measures 840 yards.

The Use of Apprenticeships.

M. Benoit-*Duportail*, a French engineer of eminence recently delivered the following opinions in relation to this matter, before the French Institute of Civil Engineers:—

"Apprenticeship is not special to manual trades, but common to all professions without exception. The young painter and sculptor, who pass several years in the studio of a renowned artist, are serving their apprenticeship. The case is the same with the young architect or engineer, who draw their plans and designs under the eye of another architect or engineer; with the young notary, who enters as seventh or eighth clerk into an office, to learn how to draw up marriage certificates, sale contracts, and inventories after decease; with the majority of merchants who serve their apprenticeship under the name of clerks in some shop or other; and it is the same in all conditions, in art, trade, and the professions in general. There is difference only in the nature of the work done. The means and progress are everywhere and always the same. The young men who follow a diplomatic career are themselves obliged to enter a ministry, prefecture, or the office of an ambassador to serve their apprenticeship. One must enter a study, a studio, an office, and a shop to learn those thousand details and secrets, the inner machinery of each speciality.

"It is in the establishments where is practiced the profession to be embraced, and there only, that professional teaching must be sought– one's apprenticeship passed. No school can replace the workshop, the shops, and the offices. Do not, then, let us seek to create with much trouble schools which would cost dear and be of no use. Let us develop the apprenticeship too much neglected during the last twenty years. Let it be recommended by men who have influence in industry, and we shall be sure of having clever and intelligent workmen, and good and beautiful produce which will rival foreign produce with success. What is in fact wanting is not a sufficient number of workmen to supply the needs of industry, but really clever workmen.

"In the interests of industry, and for the welfare of the apprentices themselves, in view of their future, it were highly advisable that patrons should admit no apprentice but with the warrant of a detailed apprenticeship contract, clearly stipulating the obligations and reciprocal engagements of either party. In these conditions the work-rooms would become what they should be—veritable schools, where the apprentice would receive the professional training necessary to him."

M. Benoit-Duportail considers the proportion which ought to exist between the number of workmen and apprentices. He remarks that the mean duration of a serious apprenticeship being from three to four years, and the period of practicing a profession being generally thirty-five or forty, the proportion should be about ten in one hundred, if there were no modifying causes. But as he finds in all work-rooms a considerable number of drudges, and as some employments—such as those of digger and smith—need no apprenticeship, he changes the relative number to five or six per cent. The proportion might with advantage be larger in the work-rooms commanding the best resources, richest in the means of instruction and practice, and most favorable to the development of young intelligence.

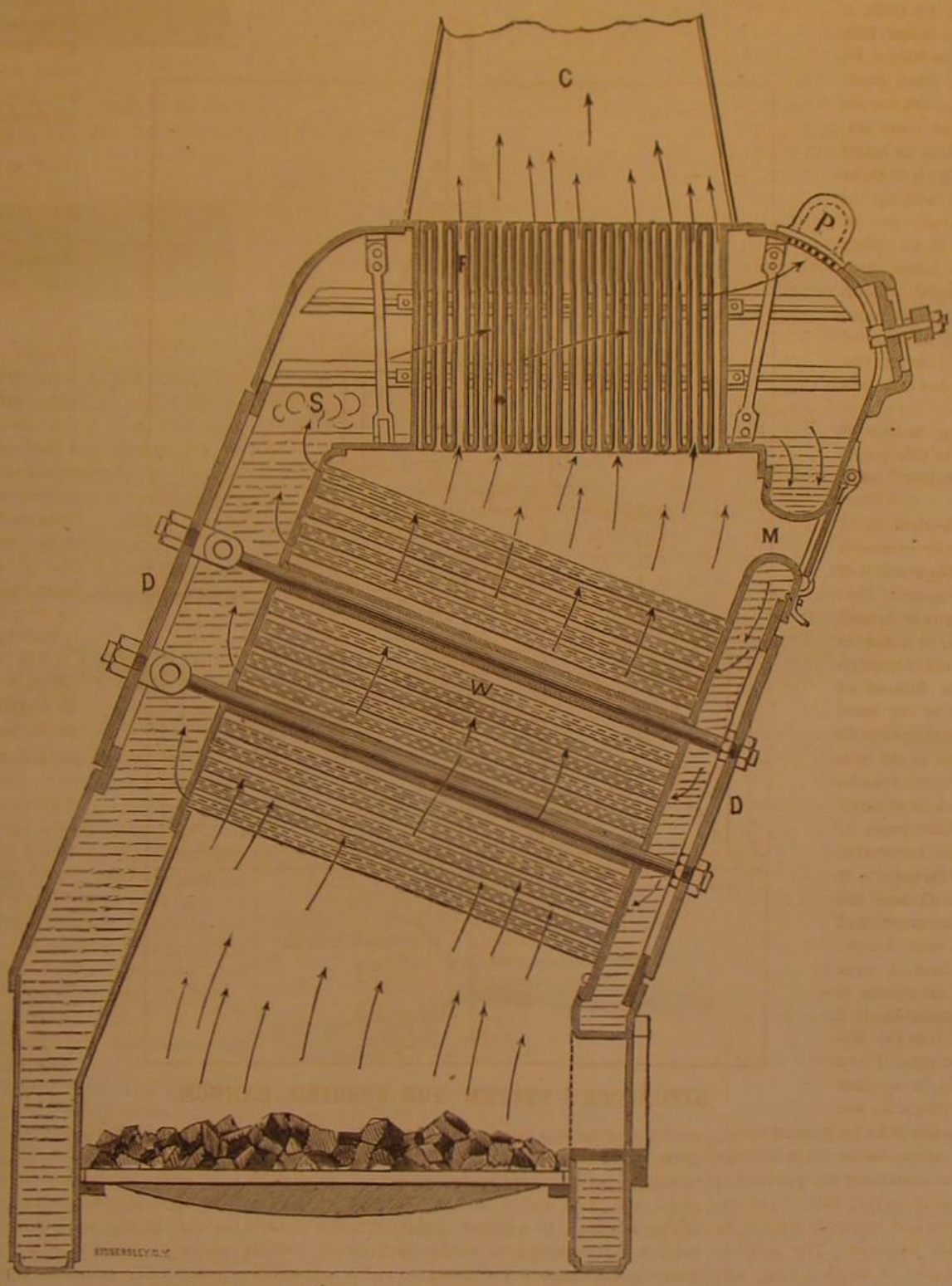
Keep the oil holes of boxes plugged up and the bearings will wear longer.

Improved Steam Boiler.

In order to produce a perfect steam boiler three conditions must be complied with. First, The capacity to burn the largest amount of fuel in the smallest space and time. Second, The most complete absorption by the water of the heat produced; and, third, The delivery from the boiler of the heat thus produced and absorbed, in pure *dry steam*, unmixed with any water held in mechanical suspension by the steam.

The accompanying sketch illustrates a boiler designed to fulfill these conditions. The inclined tubes above the fire are filled with water and connect the opposite water spaces of the boiler, while the vertical tubes are surrounded with water at their lower ends and with steam at their upper ends, the products of combustion passing through them to the chimney after having passed among and outside the inclined tubes below. The inclined tubes are about as long as the grate bars, and have spaces between them one half of their diameter, so that the draft opening is about one-third as large as the grate surface—the same proportion being maintained in the upper tubes; whereas one-eighth of the grate surface, or 16 square inches of opening to 1 square foot of grates—is a very common proportion for good working boilers. The capacity of the boiler to burn coal is therefore very large. When the heat is applied to the lower tubes the water at once begins to ascend through the tubes and up the back water space, and to descend down the front water space, which is unaffected by the heat; and the more rapid is the fire the more rapid will be that circulation. As steam is made, it rises with the water to the surface at S, where it bubbles up, as is usual in boilers charged with water mechanically suspended in it; but before this wet steam can escape from the boiler it is compelled to traverse the cluster of hot tubes which interpose between it and the steam pipe, P. These tubes operate to dry this steam by two methods; first, as a screen or sieve to which the water adheres as it is passed along; and secondly, by giving out the heat that is within them to the wet steam which is sweeping along on their exterior surfaces at right angles to the current of hot gases passing through them. The effect is, that when the steam reaches the pipe, P, it is superheated, and no water escapes with it to the engine. The degree of heat imparted to the steam will be controlled by the hight of the water in the boiler, which may cover any desired amount of the superheating surface, thus converting it into evaporating surface and reducing its superheating power. The water having lost its steam at S, descends through the water front as "*solid water*," and when the aperture at P is opened, no water under it can be drawn up and thrown out, because it is free of steam and is descending in a direction opposite to that in which it must go in order to pass out of the boiler.

One of these boilers, constructed for the *Idaho* steamship, has been in operation at the Morgan Works about a year, and has been subjected to a great variety of tests. It is found that the heat is so perfectly absorbed by the circulating water, that with a coal fire burning at the rate of 16 lbs. of coal an hour, on a square foot of grates, lead will remain without melting, although the fire is within eight feet, and the draft is straight up through openings one-third as large as the grates. In blowing off steam no water escapes, and the steam is blue and transparent for a considerable distance from the end of the pipe, thus showing that no heat is lost by working water.



DICKERSON'S PATENT BOILER.

As the sketch shows, the boiler is arranged with doors, D D, which may be easily removed, thereby giving access to both ends of the inclined tubes, for cleaning or repairing, while through the man-hole, M, the lower end of the fire tubes may be approached, and in the chimney the upper ends. Thus every part of the boiler, inside and out, is accessible.

This boiler was invented by Edward N. Dickerson, of this city. Patents have been procured in England and France, as well as in this country, and further information in relation to the invention may be obtained by addressing the inventor at 37 Park Row, New York.

SOUND.—The velocity of sound decreases with the temperature. At 10° it is 1106 feet, and at zero it is only 1093 feet per second.

The Mount Cenis Tunnel.

"Galignani" has the following, taken from a highly interesting article by Emile Level, in a late *Revue Contemporaine*, which gives some curious details about the piercing of the tunnel between Modane and Bardoneche. We quote:—

"It is well known that the whole length of the tunnel, when completed, will be 12,220 metres. The machine used for the purpose is M. Sommelier's perforator, set in motion by compressed air. It consists of a piston working horizontally in a cylinder, and carrying a chisel fixed upon it like a bayonet, which at each stroke dashes with violence against the rock to be pierced. Each time the chisel recoils, it turns round in the hole, and as the latter is sunk deeper and deeper, the frame or shield, which carries, not one, but nine perforators, advances in proportion.—While the chisel is doing its work with extraordinary rapidity, a copper tube of small diameter keeps squirting water into the hole, by which means all the rubbish is washed out. Behind the shield there is a tender, which, by aid of a pump set in motion by the compressed air, feeds all these tubes with water. The noise caused by the simultaneous striking of all the chisels against the rock is absolutely deafening, enhanced as it is by the echo of the tunnel.

All at once the noise ceases, the shield recedes behind it, and the surface of the rock is perceived riddled with nine holes, varying in depth between 80 and 90 centimetres. These holes are now charged with cartridges, slow matches, burning at the rate of 60 centimetres per minute, are inserted, and the workmen retire in haste. The explosion seems to shake the mountain to its base. When all is over the ground is found covered with fragments of rock, and an advance equal to the depth of the holes has been obtained. On the Bardoneche side this year the advance per month has been 50 metres; on the Modane side it has not exceeded 38 metres per month, owing to the greater hardness of the rock on that side. There still remains a length of about 8250 metres to be got through. When completed the tunnel will have required the piercing of 1,220,000 holes, 550,000 kilogrammes of gunpowder, 1,550,000 metres of slow match; and the number of bayonets rendered unserviceable will amount to 2,450,000.

Long Beards.

Hall's Journal of Health and the SCIENTIFIC AMERICAN, in their several spheres the most popular papers issued in this country, are advocating long beards. These journals seem to think that a thorough coating of hair adds beauty to "the human face divine." Whether that is to settle the question for the future for us poor male bipeds remains to be seen. For one, we intend to resist manfully before

we surrender—at least we mean before *our mouth is closed* like a backwoodsman's bear-skin powder pouch, to enter our solemn protest.

Do these reformers expect us to believe that a man appears best when his face is so disguised that one would as soon hunt for a mouth at the back side of his head as the front? For one we can't see it. What are we coming to? We have no suitable implements with which to feed ourselves in the event of this fashion becoming "the law of the land." But, hold! Yes, the thought has just occurred to us—we saw in the Scientific American a wood cut representing a spoon for this very purpose. The "bowl" and handle are formed in the ordinary fashion, and a strap of the same material passes over the top forming a sort of funnel. We could name several objections to this new invention, but we have a plan of our own much to be preferred to the patent *hair* spoon—and for one, when "worse comes to worse," we mean to adopt it—and as we do not intend to apply for a patent, all others are at liberty to make the most of our suggestions. These implements, like most improvements, are "cheap, simple and not liable to get out of repair," and now, presuming that the reader is fully prepared for the announcement, we say—for the more solid, nutrimental aliments the patent Sausage Stuffer is just the thing—and for those who indulge in whisky, lager, coffee, tea, buttermilk, &c., the instrument most resembling, but not te hnically styled, a squirt gun, would seem perfectly adapted. What say you, Messrs. *Hall* and *Munn?*

[We copy the above from the Tunkhannock, Pa., *Republican*. We think the suggestion a good one. Let it be tried by all means.—Eds.

Blockade Runners Captured in 1864.

We have a copy of the Report of the Secretary of the Navy for the year 1864, which contains among other things a list of the vesse's captured in attempting to elude the blockade in 1864. The total number caught or destroyed is eighty-eight Of these seventy-eight were captured by merchant built steamers employed on blockade duty by the navy, leaving *only ten* captured by naval vessels proper. Of these ten two were caught in a sound or inlet where there was no escape, one by the *Sassacus*, and one by the *Sonoma*. Two others were taken, one by the *Kanawha* and others, and one by the *Matabassets* and others; but how many and what vessels were "the others" is not stated. One was caught by the *Minnesota*, a frigate of the old navy, and one by the *Fequot*, built by Mr. Wright not on the navy plans. Four out of the eighty eight were caught by the new navy in the open sea and when the vessels were unaided in the capture; and only six in the open sea whether with or without aid.

We look in vain for the *Eutaw* and other fast naval vessels; their names do not appear; although when the *Eutaw* went into the blockade we were told that she would be heard from. What is the reason of this undeniable fact? Is it true that our naval vessels lack speed? What other explanation can be given?

Rag Boiler Explosion.

Wednesday, Dec. 21st, a boiler used for steeping rags exploded in a large paper mill in Troy, N. Y. The explosion was so violent that it blew down and destroyed a large brick building filled with machinery, breaking timbers a foot square into splinters, and doing damage to the amount of at least $40,000.

As rags are steeped under a pressure of 60 lbs. or more to the square inch, the explosion is no stranger than the explosion of any steam engine boiler. It doubtless resulted from imperfect construction or careless management. A small part of the $40,000 loss would have paid for a good boiler and would have hired a competent man to take care of it.

Big Oil Stories.

Oil wells have done big things in their day. The Philips well has flowed two thousand barrels per day; Empire well three thousand; Sherman well fifteen hundred; Noble well fifteen hundred; Caldwell well eight hundred; Maple Shade one thousand; Jersey well five hundred; Coquette well fifteen hundred; Reed well one thousand."

We copy the above from an exchange, and would like to believe that the statements are all true; but our courage fails us just at the point of believing.

TURNING TOOLS.

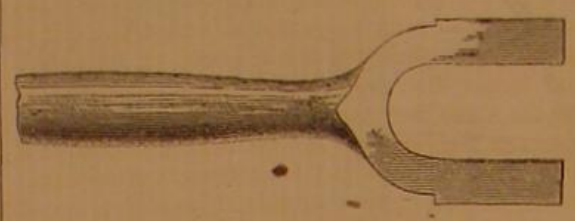
PART FOURTH.

With a roughing tool and a finishing tool any one can turn out good work with a little experience, and observation will supply from day to day much more instruction than we could impart in a page of this journal. In complicated work, or in places where ordinary tools cannot be used, it may be of some benefit to our readers to bear in mind what follows.

The forked end of a connecting rod is a difficult thing to turn nicely. It is not troublesome to roughhew it, to make plunges at it with a round-nosed tool, to make chatters in it, or leave it in such a state that it will take a finisher three or four days to file it up. But to turn the various corners neatly, to leave the edges sharp, and the outline without ridges, is a nice piece of work, and on *no* other job can the turner show his ability better.

This is the piece of work spoken of, and although it is quite simple in its appearance, it is very trouble-

Fig. 19.

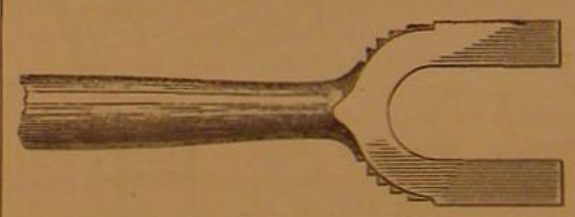


some. It is flat on the face toward the reader, and unless the finishing and roughing tools are set at the proper angles, and well secured, they catch under the advancing edge and break off or jump in. Every mechanic knows what mortification it is to have a tool act thus; for when the surface has been finely finished elsewhere one unlucky mischance by catching may spoil the whole.

As the rod comes from the forge it is rough, and in heavy rods for marine engines, such as we now speak of, especially so. If it is troublesome to turn the rod it is bad to forge it, and the blacksmiths generally leave an abundance of metal

After the rod is laid out with the curves expressed on the drawing, and properly centered, the turner takes a square-nosed tool and runs in nearly to the lines all round, as in this diagram.

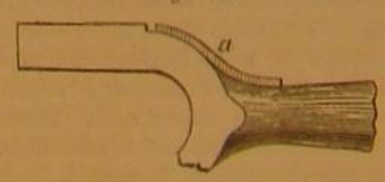
Fig. 20.



This roughs out to the outline neat and clean, and develops the shape perfectly. It is handier than any other method, because the workman knows exactly what he is doing. Instead of skipping about, taking off a lump here and a chip there, he goes steadily on to the end, and never makes one turn of the feed-screw handle without some advancement.

A square-nosed tool is better than any other for this purpose, because the edge, or corner, takes hold fairly and firmly, while the round nose, although it conforms to the curve better, is continually working or crowding off. When the tool has to be worked down a distance by hand, as in this diagram, it is

Fig. 21.



better to put in an ordinary roughing tool, with the feed in, and start at *a*, and cut it right down at once to the center punch marks denoting the outlines. In this way the lathe does much more work, for no man can feed as regularly and steadily, or as effectively, as the lathe itself can.

When the outline is once developed, and the ridges cut off by a bent side tool, the outline of the curves will present a surface consisting of a series of smooth-faced angles without a rough cut, a "dig," or a chatter upon them. After this it is an easy thing to cut off the tops of these angles, and make one fair and beautiful sweep of the whole outline. The surface will shine as bright as the face of a mirror, and be as true as a pair of dividers can lay it out. We know this because we have tried it.

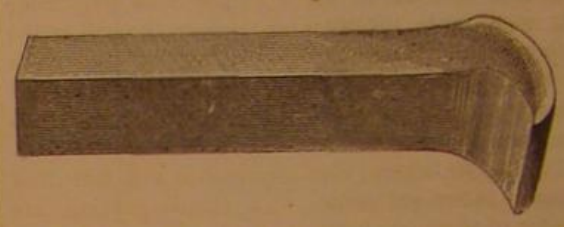
The final finish can be well given by a tool con-

Fig. 22.



structed as shown in Fig 22, and the reverse curve as in this cut (Fig. 23). It must be borne in mind

Fig. 23.



that these tools have but little cut, or rake below, for the circle they cut on is very large and short, circumferentially, and a raking edge will jump in, while one too straight will push off. The linear length of the tool, or distance along the line of cut, should not be great, for the liability to spring is very greatly increased thereby. From two to three inches, and even less, ought to be sufficient for rods of ordinary marine beam engines.

Correspondence

A Well-expressed Compliment.

Messrs. Editors:—Inclosed find $3 for the Scientific American for one year, commencing January, 1865. A journal that combines so much that is artistic and beautiful with so much that is valuable and instructive I wish every success. I appreciate harmony in every thing, and I love to associate external beauty with richness of soul.

Hoping that prosperity may ever be your portion, I am, yours very truly, Wm. H Stevens.

Fredonia, Dec. 18, 1864.

Influence of Colored Light on Sorghum Molasses.

Messrs. Editors:—I take the following extracts from my memoranda:

Four cylindrical glass tubes, each of 1½ ounce capacity, and respectively of blue, red, green and yellow color, were filled three-fourths full with sorghum molasses, of a clear wine color, closed with cork stoppers, and exposed to the rays of the sun. After two months' exposure, the appearance was as follows:—The molasses in the red tube was covered with a moldy scum; that in the yellow tube had a flaky sediment; the molasses in the blue glass tub kept perfectly clear, and the peculiar taste of the sorghum was considerably diminished; the molasses in the green glass tube was similar to that in the blue, but not quite so perfect. The cork stoppers were removed; the scum in the yellow and sediment in the red tubes were also removed; the four tubes afterward covered with paper, to prevent the dust from falling into them, and exposed for two months longer to atmosphere and sun. A moldy scum appeared again in the yellow tube, a sediment in the red, while those of blue and green color remained clear as before. This experiment shows that molasses will keep best under the influence of blue color. The sorghum molasses contains a good portion of gum, also likely pectin.

The process of Prof. Goessling's patent, spoken of in Vol. XI., No. 25, consists, as I understand, mainly of a method adopted by Robert Philips, of Germany, published in No. 9, *Oeconomical News*, for the year 1843; also in Vol. I of Dr. Ludwig Gall's practical

communications to the agricultural profession, page 408, year 1855. The process is, 1st, Extracting the starch from the corn in the usual way; 2d, Converting the starch by diastase or malt into glucose; 3d, In another vessel converting starch into starch sugar, by aid of sulphuric acid. When sugar is formed in this way the glucose sirup is added to that boiling with sulphuric acid, to produce a more complete conversion of dextrine into grape sugar. The action of malt or diastase on starch will stop when 30 per cent of sugar is formed.—*Comptes Rendus*, December, 1861, Vol. III., page 1,217; A. Payen.

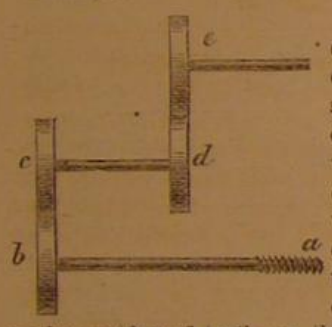
According to T. Musculus (*Comptes Rendus*, 1861,) only 33⅓ per cent of sugar is formed by the action of the diastase. T. A. Hoffmann.

Change Gears for Lathes.

Messrs. Editors:—I noticed in your issue of the 10th inst., a method of calculating the change gear of lathes, by Chas. E. Albro, of New York city. Your editorial hint to careful mechanics, at the end of the article, was well timed. Most machinists' lathes, with simple gearing, will cut just double the number of threads to the inch with the gearing mentioned in the examples of Mr. Albro.

I think Mr. Albro has overlooked the fact that most machinists' lathes, with simple gearing, are furnished with an auxiliary spindle called the change gear spindle or stud, which is generally, though not always, geared to move at half the speed of the main spindle of the lathe head. To obtain a correct solution of the problem it is necessary to take the movement of this auxiliary spindle in relation to that of the main spindle into the calculation; for instance, if, as in the case of Mr. Albro, 12 threads to the inch are wanted, and the change gear spindle moves at half the speed of the main spindle, it will only make 6 revolutions while the main spindle makes 12; consequently it must be 6 and not 12 which we multiply in order to get the correct relative proportion, or number of teeth, of the two gears required.

Example:—



Let a=the number of threads to the inch on the lead or feed screw; b=the number of teeth on the screw wheel; c=the number of teeth on the loose wheel of the stud spindle; d=the number of teeth on the fast wheel of the stud spindle; e=the number of teeth on the main spindle gear. Then the number of threads to the inch, which any change will cut is equal to $\frac{a \times b}{c \div (d \div e)}$ or $\frac{b}{c}\left(a \times \frac{d}{e}\right)$.

Let y represent the number of threads to the inch wanted, then—$\frac{c}{a}\left(y \div \frac{d}{e}\right) = b$ and $\frac{a \times b}{y \div (d \div e)} = c$

Let m represent any number used as a multiplier, then—$m\,(y \div \frac{d}{e}) = b$

and— $m \times a = c$

All that is necessary to calculate for fractions of threads is to convert vulgar into decimal fractions, and multiply in the same manner as you would for whole numbers. For compound gearing different equations are necessary, as the intermediate gearing has to be taken into the calculation also.

A. Buckham.

Newark, N. J., December 10, 1861.

[We understand Mr. Albro's rule to refer to lathes with simple gearing only, that is *one* intermediate between the spindle and lead screw; in which case the intermediate is of no importance. Modern lathes are made as Mr. Buckham states, but there are many old-fashioned lathes for common work that have but three wheels—one on the spindle, one intermediate, and one on the lead screw.—Eds.

Advantage of Deep Raceways.

Messrs. Editors:—I believe that the advantage of having raceways of considerable depth is not universally understood. Messrs. A. C. Seeley & Co., of Danbury, Conn., have a discharge raceway ninety rods long, from their water wheel to the river, eight feet deep, and ten feet wide on the bottom, and level. They use a Reynolds Water Wheel which takes 168 inches of water under 7 feet head, and the discharge raceway fills just 12 inches deep with water, when the wheel is in operation. In the winter season, experience has shown that it was a great advantage to have the raceway deep, as it kept clear of ice even in very severe weather. A. T. P.

HOW MILK IS CONDENSED.

In our last volume we published an article on Condensed Milk which gave some interesting general particulars. We find in the *Daily Tribune* some additional facts which are also interesting; we repeat for the benefit of our readers.

We will start from the platform where the cans are received from the farmer, and take the reader step by step through the whole process.

If the cans "pass muster," they are immediately emptied through a fine cloth or strainer into the receiving vat, which holds a thousand quarts. From that the milk flows through a pipe, and is drawn into brass pails which hold fifty quarts each. These stand in a flat tub capable of holding fifteen pails at once, which is filled with water that is heated by a coil of steam pipe. Here the milk is heated to 190°-195°, and in this first process of the work of condensing lies the whole secret of success. This was the discovery of Mr. Borden. He was not the originator of condensed milk. It had been thought of and processes patented before the date of his patent, but all had failed, because the albumen of the milk, if boiled in open kettles, burnt upon the bottom, and if *in vacuo*, coated the pipes and vessels, preventing perfect condensation, and, if heated too high, giving an unpleasant odor to the condensed milk. When thus cooked upon the inside of the condenser, the albumen became an insoluble cement, which required great labor to remove, and which, if not removed, would spoil the next charge.

In this water bath, in these open pails, the albumen is coagulated, without separation from the watery portion of the milk, and a little portion that adheres to the pail is almost instantly removed by placing the pail bottom upward over a steam jet, instantly followed by a strong water jet, in the same way that the farmers' cans are so perfectly cleansed. Until this plan was adopted, the work of cleaning off the coagulated albumen was very laborious. Now it is almost instantaneous.

This first process requires but a few minutes, and two men stand ready to hook a tackle to the pails as fast as the contents reach the proper temperature, and hoist them out of the bath and empty them through a fine brass wire gauze sieve into what is termed a "steam well." This is a copper vessel shaped like an egg, standing on end, with about one-fourth of the upper end cut off. This holds about seven hundred and fifty quarts—six and a quarter barrels. This well is made with a steam jacket over the lower end, so that the milk, which is already heated almost to the boiling point, is soon brought to that degree, and is then ready to go to the condenser.

The first boiling in the open kettle appears to be another of the requisites in the preparation for the final operation, as it gets rid of something in the milk that tends to make it foam in the boiler; and if there is any defect in the condition of the milk, it is exhibited here in this open kettle, and the deposit of albumen that takes place during the first boiling is easily seen and cleared off between the changes. There are two of these steam wells, with their accompanying water baths and receiving platforms. From these the milk is taken by what is generally termed suction, through tinned iron pipes, to the floor above where there are three condensers, or vacuum pans. These in form are somewhat like the steam well, the egg shape being complete—being four or five feet diameter, and holding one thousand quarts. In the upper part on one side, there is a window, through which strong sunlight, or lamplight, is reflected to the bottom, and opposite this there is an eye-glass, through which all the movements of the milk are seen, and by that means the boiling is regulated. There is also a manhole, through which a man enters after each charge is withdrawn, and scrubs the copper bright enough to almost see his face in it. The lid of the manhole being screwed on, the pan is to ready commence receiving a charge. The first operation is to start a powerful double-action air-pump, which exhausts the air in the vacuum pan until the gage shows twenty to twenty-five inches.

The cock in the pipe connected with the steam well is now opened, and the milk rushes up to fill the vacuum. This pipe, by the by, is inserted into the milk from the top, and does not extend quite to the bottom, so that if any sedimentary matter has accumulated there from the boiling, it is not taken up to the condenser. As soon as the first charge is drawn up, more milk is prepared ready in the well for the next demand. The steam is now let on, heating the coil of pipe inside, and the steam jacket outside of the condenser, the pumps being kept in continual operation, and the milk closely observed by the intelligent Yankee girl (one of the "mudsills"), who has charge of the pan, and prides herself in keeping it and all around as neat as she does her person, and all are faultless. In a few minutes she observes the thermometer indicate 190° and that the milk *in vacuo* is boiling rapidly. In open air at this elevation it would require 210°, and could not have eighty per cent of the water it contained removed, as is the case in the condenser.

As the boiling goes on, the milk continues to flow in, until 3,200 quarts have been taken up. Then the cock of the supply pipe is closed, and from this time the most watchful care of the attendant is required to keep the heat regular, and the pumps working perfectly. The pumps stand upon the lower floor, where a stream of cold water flows upon the air chamber, and condenses the steam vapor drawn from the boiling milk into water, which is discharged into a stream constantly flowing through the building. This condensed vapor constantly emits that peculiar odor that we perceive in milk warm from the cow, or during the operation of boiling, and which contains the germ of putrefaction. When the charge of 3,200 quarts shows by the gage that it has been reduced to 800 quarts, it is ready for the final operation of purification. The steam is shut off, and its place filled with cold water, the effect of which is to condense the vapor in the air-tight pan, and thus diminish the pressure. This increases evaporation, and the effect is to throw off all the remaining odor, through the discharge of the pumps. This often has such a fetid, sickening smell, that it pervades the atmosphere all around, and affords one of the most convincing proofs of the value of the process that discharges such a substance from our daily food.

From the time the milk is received from the wagons until it is finished in the condenser, about three and a half hours are required for all the operations. It is then drawn into ordinary milk cans, and these are placed in an ice bath in the lower room, and require an hour and a half to become perfectly cold. It is now ready for shipment to the city. In summer time it is kept icy cold by means of an "ice core," that is a tin tube filled with ice, inserted in the cans, occupying about one-fourth of the space. Ordinarily, the milk drawn from the cows night and morning is condensed during the day and shipped at night, and delivered to city customers the next morning at thirty-two cents a quart.

It is a very curious fact that although only four quarts are condensed to one, when pure water is added to reduce the article again to milk, it is invariably found that it requires four quarts of water, and that the milk is then better than what is really pure milk, as drawn from the cows, and far better than much that is sold as pure milk.

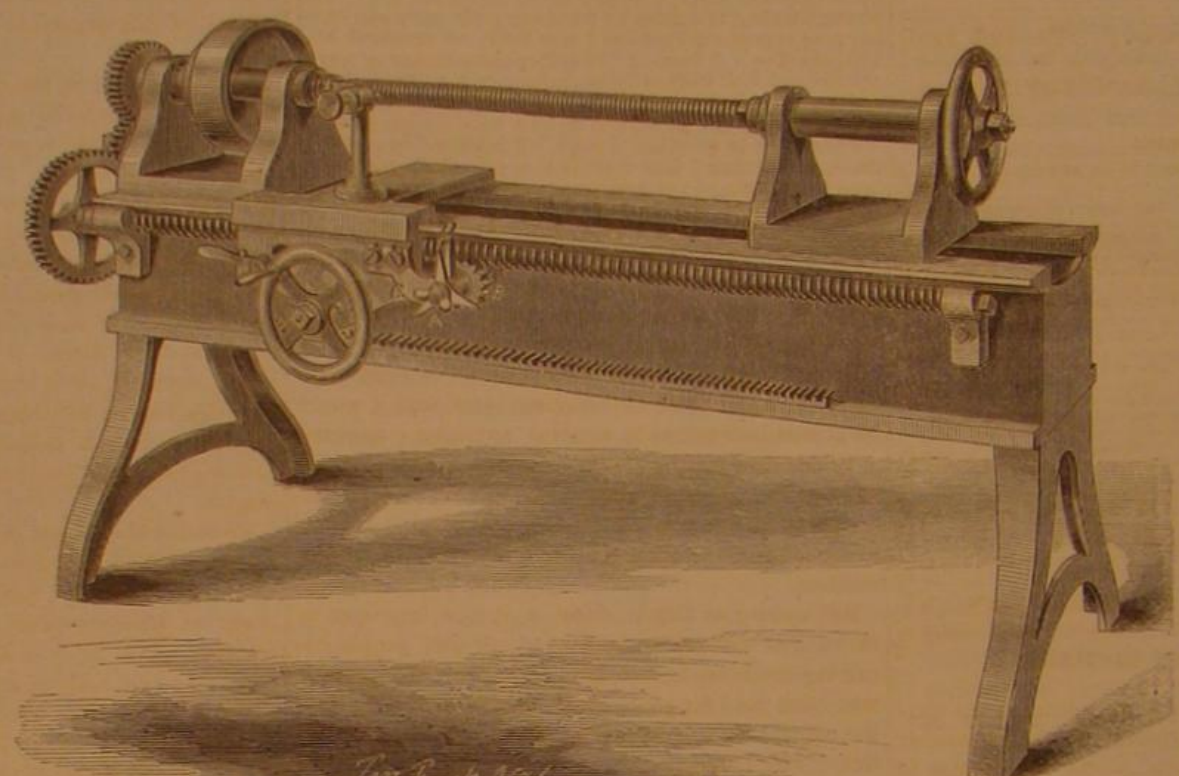
The Pneumatic Loom.—Mr. T. Page, C. E., reports on a new system of weaving by compressed air in the pneumatic loom. The improvement will affect the working of nearly 500,000 power-looms, the labor of more than 775,000 persons and the manufacture of about 1,200,000,000 lbs. of cotton alone. The principle upon which the new loom acts is that of discharging a jet of compressed air from the valves of the shuttle-box, upon the end of the shuttle, at each pick or stroke, and thus substituting for the imperfect motion of the "picker" the pneumatic principle, simply applied. The working velocities will be in proportion of 240 strokes by the new machine per minute, to 180 strokes of the old in the same time. This improvement applied to the whole of the power-looms of the United Kingdom would represent a total increase of 1,400,000,000 yards over the produce of the same number of machines.

Improved Screw Cutting Index.

All lathemen who have cut screws know that the tool sometimes rides on the top of the thread unless it happens to come in exactly the right place. When the carriage is run back by a cross belt, the tool always comes in the right place, for the relative positions of the tool and the thread are unchanged. It consumes time, however, to do this, and very many mechanics prefer to throw the feed out, run the carriage back by the hand wheel, and jump the tool in as the thread comes round.

The object of this invention is to make the operation certain, for it sometimes happens that the most skillful workman hits the top of the thread and strips it off for a turn or so before he can run the tool back. The index here illustrated consists in affixing a three fingered pointer, A, to a shaft, whereon a wheel, B, is keyed. This shaft runs in a bracket, C, bolted to the apron of the lathe. The wheel is in contact with the lead screw, and when this is in operation the pointer remains stationary.

Now supposing the cut to be started, the pointer will be opposite the vertical arm, D, also on the bracket, and will remain fixed while the feed is in. When the tool has traversed the length of the work the feed is then thrown out and the carriage run back by hand, and when any one of the pointers come opposite the vertical arm the feed is thrown in and the tool can be run in with a certainty that it will also strike the center of the space. This is a very convenient arrangement and can be applied to any lathe in a short time; when not in use it can be detached and laid on one side.



BAKER'S SCREW-CUTTING INDEX.

It saves half the time, also the use of an extra belt and one or more pulleys on the counter shaft, and is not liable to derangement. It was patented on Nov. 1st, 1864, through the Scientific American Patent Agency, by J. G. Baker, of the firm of Henry Asbury & Co.; for further information address the above firm, at Nos. 67 and 69 Laurel street, Philadelphia, Pa.

Gunpowder Explosive by Percussion.

Knapp, in his Chemical Technology, says,

"The inflammability of dry powder by a mere blow without fire is a well known fact, and has more than once been the cause of accidents. That this property is not always due to an accidental mixture of other matters, as sand, &c., but is really a property of the powder itself, was proved by the experiments instituted at Freiberg with blasting powder made from chemically pure ingredients, namely, 63.3 saltpetre, 20.0 sulphur, and 16.7 charcoal. Out of ten samples, which were wrapped in paper, and struck upon an anvil with a heavy hammer, seven of the corned powder exploded, and nine of the powder in the form of flour. Other kinds of powder behaved in the same manner. It is of importance, in the construction of powder mills, to know that the explosion occurs most easily by a blow from iron upon iron, iron upon brass, brass upon brass, even lead upon lead, and lead upon wood, but not so easily from copper upon bronze or upon wood."

Some time ago some persons who were boring for oil in Wirt county, in West Virginia, and had reached a great depth, dragged up with the pump a piece of calico. The operators were very much astonished at the discovery, and the people in the neighborhood were induced to believe that some persons down in China were sending up specimens of their calico printing

ANCHOR ICE.

Water is at its greatest density at the temperature of 39°·7 above the freezing point. If water, warmer than 39°, is cooled at the surface, this surface water becomes denser than the remainder and sinks to the bottom. By this process the whole body of the water is cooled to 39°, when any further cooling of the surface makes the water less dense, and it remains till it cools to 32°, when it crystallizes into ice. Were it not for this singular property, the whole mass would be cooled to 32°, and frozen solid. Sometimes when water runs in shallow streams over a rocky bed, it is so mixed that the whole may be cooled to 32°, and the freezing may begin at the bottom, producing what is called anchor ice. This we have supposed to be the correct explanation, but a correspondent from Maine speaks of anchor ice occurring in ponds. If it is really observed in deep still ponds some other explanation must be sought.

CADWELL'S PHOSPHATE DISTRIBUTER.

This utensil is intended to facilitate the distribution of fertilizers on corn, cotton, tobacco, or other plants; either plaster, ashes, lime, salt or phosphates may be used in it. It can also be employed for depositing guano, bone dust, etc. in the hill before planting.



The quantity let on at once can be graduated from a thimblefull to a handfull, and a simple jolting or shaking motion is all that is required to work it. By the employment of this utensil the fertilizer is scattered evenly instead of in lumps or spots, as is the case in more imperfect methods. The garments and person are also fully protected from contact with the noxious and destructive, as well as disagreeable, agents sometimes used. It also expedites the work and is in other respects advantageous. The arrangement is simply a tin case with a perforated bottom, as shown in this engraving, which is covered with a slide, also perforated. On turning the inner slide by the button, A, the apertures are increased or diminished at will, thus regulating the quantity of fertilizer deposited. Any tin smith can make one in a short time. It was patented, through Scientific American Patent Agency, on the 17th of Nov. 1863, by J. R. Cadwell, Dexter, Mich For information concerning rights, etc., address him at that place.

The Ames Gun.

The wrought iron cannon made by Mr. Ames at Falls Village, after having been fired 700 times to test its strength with such immense charges of powder and balls and shells, that Gen. Gilmore, it is said, stated that it was the most severe test any gun was ever subject to without exploding, it is to be tested still further. It is said the government agents have purchased the gun for the purpose of experimenting upon. They intended first to bore out and enlarge the caliber; this, of course, will tend to greatly weaken the gun, and also to admit still greater charges.

Should it then stand the tests which they design to apply, they think of dissecting the animal by cutting the entire gun into thin slices by means of powerful machinery which is estimated to cost $10,000—these slices to be closely examined with a magnifier, for the purpose of finding whether there are any unwelded spots or flaws in the construction of the gun, and also to find if the severe tests which have been applied have caused any slight cracks, or even separation of the particles of iron, which might not be visible on the outer or inner surface. Mr. Ames has completed 10 or 12 other guns like the one above alluded to, which are to be tested this week near his foundery. It is said that the government has contracted for them, and that they are to be put to immediate use. Jeff Davis will then probably hear something he won't like.

The iron of which these cannon are made is the pure "Salisbury Iron," and was smelted from the ore of Messrs Landon, Botsford & Co., at Chapinville in this town, and is what is known among iron dealers as "cold blast charcoal iron," and was received by Mr. Ames in the form of cast iron pigs, and by him converted first into wrought iron, then into the best cannon ever made in America and probably the whole world.

Emigration a Loss to Cotton Spinners.—Mr Heywood, the Secretary of the Cotton Supply Association, estimated by a division of the margin of wages and profits in 1860, that the sum of £81 would be lost to the trade for every working hand that emigrated. The emigration of 50,000 hands would, at this rate, involve a loss of £4,000,000 a year. He maintained that it would be better to keep 600,000 hands at a weekly cost of 2*s.* 6*d.* each, for three years, with a total expenditure of £12,000,000, than to incur a direct loss in that period of £147,000,000 in wages and profits.

It is claimed that our telescopes are now perfect enough to discover any dwelling over 40 feet high on the moon.

THE

Scientific American.

MUNN & COMPANY, Editors & Proprietors.

PUBLISHED WEEKLY AT
O. 37 PARK ROW (PARK BUILDING), NEW YORK.

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

☞ "The American News Company," Agents, 121 Nassau street, New York.

☞ Messrs. Sampson Low, Son & Co., Booksellers, 47 Ludgate Hill, London, England, are the Agents to receive European subscriptions or advertisements for the SCIENTIFIC AMERICAN. Orders sent to them will be promptly attended to.

VOL. XII. NO. 4 ...[NEW SERIES.]....*Twentieth Year.*

NEW YORK, SATURDAY, JANUARY 21, 1865.

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DEFECTIVE IRON CASTINGS.

It is not uncommon to see large iron castings constructed with little or no attention to the expansion and contraction of the several parts. Examples of the practice in question may be found in stationary engine frames. Cumbrous pillow blocks are cast upon them and immediately beneath is a large opening surrounded by sundry "filagree arms, scrolls, and similar articles," which, in the pride of his heart, the designer intended for ornaments. Still other instances of defective castings may be found. In turbine wheels, the step-frame, or that part which carries the weight of the wheel and shaft, frequently has large and heavy parts contiguous to light and thin ones. Large band wheels or pulleys are also examples, for from the solid hub and heavy rim spring light arms very much less in size and weight than the part to which they are attached. Car wheels of some patterns are open to the same charge, and many designs have been originated with a view to correct the fault. That it is not a trivial matter is shown by the results consequent upon malconstruction. Where the drivers of locomotives have cranks cast on them the two arms which run to the eye of the crank are sure to break in a short time, and an outside connected locomotive can hardly be found that has not these two arms broken at the points designated. Even if the the force of the steam were not exerted at that particular point the jar and tremor when running would tend to disrupt the arms from the crank.

Iron bridges are sometimes made, whereof the girders and other parts under strain are cast with such a manifest inattention to the simple and well known law herein before alluded to, that the structure has given way and the public have condemned a system for the fault or ignorance of an individual. Many castings for different purposes, some to be employed in transporting passengers, some for purposes of commerce, are weak and fragile from the moment they are dragged out of the sand, because no regard has been given to a proper distribution of the strain of expansion and contraction. If these castings be struck with a hammer, the light parts will give out a clear high note showing the tension to be great.

It is not only the breaking strain which is a consequence of bad proportion but the difference in the quality of the iron composing the whole. Though the cupola may have been charged with metal of one kind the casting will not be alike when thick and thin parts are contiguous. Large masses of iron cool more slowly than small ones, the crystals are, therefore, coarser and the metal less tenacious than small quantities of it, and it is, therefore, ill calculated to withstand torsion, compression or tension, and many accidents that are apparently mysterious could no doubt be traced directly to defective distribution of the shrinkage.

PUBLISHING INFORMATION OF GOVERNMENT WORKS.

The London *Star*, of Dec. 20, has a letter addressed to a member of Parliament by a British field officer who was traveling in this country. From the letter we take the following extract:—

I visited the famous foundery for casting Parrott guns, and the whole process was explained to me by the proprietor. I saw a 300-pounder cast, and was told the establishment could produce three guns per day. The strengthening the guns by bands or coils seems to have been so successful that (as I was told) no accident had happened to a "Parrott" in either the military or naval service. I also visited a manufactory of seven-shooters, not revolvers, but rifles, loaded through the butt, each cartridge being forced up by a wire similar to what we see used in carriage lamps. I inquired respecting these guns when I was with the army. In action they lead to a waste of ammunition, especially in the hands of raw troops: but they are very destructive when entrusted to known cool shots, and would enable a very few men to defend a narrow pass, a gateway, etc.

This courtesy to foreigners, and especially to foreign officers, is in accordance with the general practice of our Government, and we think it is perfectly proper. Our institutions demand the utmost publicity in regard to all Government acts, and it would be almost impossible to conceal anything connected with our armories and fortifications if the attempt were made. It is, therefore, just as well to take the benefit of politeness and candor, and frankly explain everything to the officers and engineers of all foreign nations.

But as long as this is done, is it not improper to throw obstructions in the way of our own people obtaining the same knowledge? They are the persons who have paid for all of these things, and who pay the officers for taking care of them. If the construction of our arms and the machinery for manufacturing them is made known to the restless, fertile minds throughout the nation, improvements will be more likely to be suggested than if this knowledge is confined to the army officers in charge and the few who understand the art of conciliating their favor.

These remarks are suggested by the recent order of Gen. Dix, requesting the papers to publish no information in relation to our forts. It seems to us that more mature deliberation must induce Gen. Dix to withdraw this request. If there is any special improvement which it is desired to keep secret, let regulations be adopted so universal and rigid in their application that they will prove efficient, but it is certainly for the good of the service, as well as right and proper, that whatever is exhibited to the agents of foreign governments should be laid open as fully and freely to our own people.

PETROLEUM AND ASPHALTUM.

Linseed oil, and several other vegetable oils have the property of absorbing oxygen and combining with it chemically to form resin. It is this property of drying oils which renders them suitable for paint.

Petroleum contains no oxygen; it is composed wholly of carbon and hydrogen, being a mechanical mixture of several hydrocarbons. Asphaltum is a resin, being composed of carbon, hydrogen and oxygen, and it has been suggested that asphaltum is produced by the conversion of petroleum into a resin by the slow absorption of oxygen.

But this is a mere hypothesis. No one claims to have succeeded in converting petroleum into asphaltum. After months of exposure the oil remains without any appearance of resin even upon its surface. It is as reasonable to suppose that under certain conditions the vegetable matter is converted directly into asphaltum, as that it is changed first to petroleum and then to asphaltum.

Asphaltum lakes may suggest the presence of petroleum in the vicinity, but they are no proof of its presence.

SWEET BRIAR.—H. Springler, of the U. S. Naval Machine Shop, Port Royal, S. C., writes us that sweet briar is very plentiful in that region, but for want of information how to prepare it no use is now made of it. He solicits information on the subject.

GROVE ON HEAT.

We recently noticed Dr. Youman's collection of treatises on the Conservation and Correlation of Forces, published by D. Appleton & Co. The first and longest treatise in the collection is that of Professor Grove.

He regards heat as a mode of motion, but takes a simpler view of it, perhaps, than is taken by any other philosopher. He says that all we know of heat is expansion and contraction. A body in cooling contracts, and this expands other bodies in its vicinity, or subject to its influence.

Professor Grove argues at great length against the hypothesis of an ethereal fluid, contending that heat is simply motion in ordinary matter. It seems to us that all of this argument is against a fancied distinction.

If the sun acts on the earth, it must be through the medium of a material connection between the two. Sir Isaac Newton regarded the denial of this as a proof that the mind of the person denying it failed to comprehend the problem. The space between us and the sun is occupied by matter, and this matter is an exceedingly attenuated fluid. Each of the sixty-four elements at present known has properties peculiar to itself. It may be that the fluid filling the interplanetary spaces is composed of the vapor of these elements, or it may be some element lighter than hydrogen; in either case, if Professor Grove chooses to call it ordinary matter, we suppose no philosopher would insist upon calling it extraordinary matter.

Professor Grove not only denies the existence of a pervading fluid, but also takes ground against the vibratory theory of heat; insisting that all of its observed phenomena are simply expansion and contraction. One body in expanding causes others to contract; one body in contracting causes others to expand. A body in what we call giving out heat is contracting; when it is undergoing that process which we call absorbing heat, it is simply expanding, in consequence of the contraction of some other body. Such, if we are able to understand him, is Professor Grove's notion of heat.

POLISHING LINEN THREAD.

At Mechanicsville, in this state, there is a manufactory of linen thread. For several years after it was started the business was unprofitable, but a new superintendent was obtained who conducts the operations with intelligence and energy, and now the company makes regular dividends. All of the flax is bought in Holland, the Dutch understanding the rotting and preparation of flax for thread better than any other people. We believe the flax for thread is cut before the seed ripens At Mechanicsville the flax is all hatcheled by hand. It is then spun into raving like cotton, and passed through a drawing frame, after which it is placed on a spinning frame to be spun into thread. As it goes from the bobbins upon the spindles it passes through hot water, and the spinning room is dripping with molsture.

A beautiful polish is given to the thread by a curious process. After the thread is reeled in skeins, a stout workman takes a bunch as big as his arm, and catches it upon an iron hook; then, passing a stiff stick through the opposite end of the loop, twists the thread tightly with all his might. Immediately untwisting it, he catches it in another part upon the hook, and gives it another twist. A few repetitions of this process impart to the thread a most beautiful, smooth, silken finish.

Piston Speed of Screw Engines.

The English iron-clad *Valiant* has double engines of the same kind as those in our sloops-of-war. They are 82 inches in diameter, 48 inches stroke, and make 60 revolutions per minute without difficulty. The screw has a fine pitch ranging between 22 and 27 feet, and can be altered between these two figures without stopping the engines. The engines of the *Re Don Luigi Di Portugallo*, Italian iron-clad, built by the Morgan Iron Works, this city, are 84 inches diameter by 48 inches stroke, and have made 55 revolutions per minute, but the pitch of the screw is 31 feet 6 inches, which is materially against a high piston speed.

Patent Claims

ISSUED FROM THE UNITED STATES PATENT-OFFICE
FOR THE WEEK ENDING JANUARY 10, 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.

45,805.—Lamps.—James Adair, of Pittsburgh, Pa.:

I claim, first, The construction of the screw, k i, with a flattened spheroidal or lozenge-shaped chamber, B, about it, substantially in the manner and for the purpose described.

Second, Making the spheroidal chamber of open work or perforated plates, substantially in the manner and for the purpose described.

Third, Constructing the spheroidal or lozenge-shaped chamber of the cone, a, with a screw, d', box, e, with tube and wick-adjuster, substantially in the manner and for the purpose described.

Fourth, The combination of two or more spheroidal or flattened chambers, substantially in the manner described.

Fifth, The combination of my specified insulator with a lamp, substantially in the manner and for the purpose described.

45,806.—Igniting Hand Grenades.—John S. Adams, of Taunton, Mass.:

I claim the combination of the recess, E, the metallic disk, D, the hook slot, F, the water-proof cap, G, and the opening tape, H, all arranged substantially as and for the purposes set forth.

45,807.—Cultivator.—W. D. Ament, of Muscatine, Iowa:

In combination with the standards, D D, adapted to be operated by treadles so as to move the plows vertically and laterally, I claim the adjustable blocks, G, resting upon the plates, E, and employed to vary or regulate the depth to which the plows penetrate the ground, in the manner herein explained.

[This invention relates to a new and improved cultivator, of that class in which the shovels or shares are rendered adjustable, in a lateral and vertical direction.]

45,808.—Machine for Manufacturing Cigars.—Jonathan Ball, of Elmira, N. Y.:

I claim, first, The use of a wire, c, and tamper, F, perforated through its longitudinal center, as described, in combination with the mold, c, or its equivalent, and with a suitable wrapper, constructed and operating substantially as and for the purpose herein described.

Second, Also the method, substantially as herein described, of introducing the filling of a cigar around a central wire, for the purpose of producing a central draught.

Third, I claim manufacturing cigars by first inserting the wrapper into a mold and afterward filling in the tobacco, substantially as herein specified.

Fourth, In combination with a machine constructed as herein described, I claim the cup or funnel, G, employed to hold the wrapper in position, and admit of the introduction of tobacco after the tamper is inserted, as explained.

[The object of this invention is an improvement in that class of cigars, which are made with a paper wrapper, and commonly known under the term cigarettes.]

45,809.—Manufacture of Glass.—John Best, of Pittsburgh, Pa.:

I claim the use of the ingredients hereinbefore described which I call granular marble, as a substitute for slaked lime or oxyd of lead, in combination with the other ingredients composing the batch or mix, as hereinbefore specified, or some of them, or their equivalents, in the manufacture of crystal glass, substantially as hereinbefore described.

45,810.—Harvesters.—Jacob W. Bope, of St. Louis, Mo.:

I claim, first, The levers, D D, radiating from movable centers, in combination with the segments arranged on the main frame, for effecting a perpendicular up and down motion of the finger bar, in front, as described.

Second, I claim the combination of the levers, D, the hinged stirrups, E, and the segments, C, for attaching and moving the finger bar, in the manner described.

Third, I claim raising and lowering the reel, by means of the levers extending under the shaft, and connected with the finger bar, as described, whereby the reel is kept equidistant from the cutting mechanism, as herein set forth.

Fourth, I claim the arrangement of the sliding friction roller, I, on the lever arms, a a, as and for the purpose herein described.

45,811.—Corn Harvesters.—Jacob W. Bope, of St. Louis, Mo.:

I claim, first, The sliding rod, f, or its equivalent, provided with a foot lever, in combination with the guide, G, and hinged table, E, substantially as and for the purposes specified.

Second, I claim the reel, F, provided with six or more straight arms, having one or more wires running through them, said wires crossing each other, or being bent to form such angles, that the stalks are gathered and discharged with ease and certainty, substantially as shown and described.

45,812.—Coupling Thills to Carriages.—D. C. Breed, of Lyndonville, N. Y.:

I claim the eccentric bolt, C, provided with cams, a a, in combination with the jaws, b b, thill hook, d, and packing, E, substantially as and for the purpose herein set forth.

I also claim securing the eccentric bolt in place, when thrown back, by means of the depression, g, formed partially in the jaw and partly in the cam, a, into which depression fits the rim, h, of the nut, G, the whole arranged and operating substantially as and for the purpose herein specified.

45,813.—Paper File.—William Burnet, of New York City:

I claim a file made of two leaves secured together by a hinge bar, and kept together by means of spring pressure thereon, all made and operating substantially as above described, or their mechanical equivalents.

45,814.—Ventilator.—Benajah J. Burnett, of Mount Vernon, N. Y.:

I claim a ventilator composed of an upright trunk, A, divided into chambers, a a, having openings, e f, above and below the roof, with opposite inclined deflectors, c d, substantially as herein specified.

And I also claim the hinged shutters, g g, with their attached brackets, h h, so applied in combination with the upper openings, e e, of a ventilator of a construction, substantially as herein described, that when open the said shutters form deflectors, to encourage the entrance of air into said openings, substantially as herein specified.

45,815.—Car Springs.—Wm. Cox, of Philadelphia, Pa.:

I claim the tapering springs, D D, secured to the sills, b b, of a railroad car truck, and resting upon lips, a a, projecting from the journal bearing, C, all being arranged to operate in the manner and for the purposes herein described.

[This invention consists in applying wooden or steel springs, or both, to a railroad car, in such a manner that the weight of the car is distributed or transmitted to the bearings of the axles from each end, and from the center of the car at each side of the same, and a very simple, durable, cheap and efficient spring obtained.]

45,816.—Spinning Top.—Louis Cramer, of Brooklyn, N. Y.:

I claim a notch, e, in the hollow arbor, b, in combination with the ratchet teeth, g, on the barrel, c, which incloses the spring, d, and with the pin, f, projecting from the shank of the top, constructed and operating substantially as and for the purpose set forth.

[This invention relates to an improvement in that class of opening tops in which a spring is employed, for the purpose of imparting to the top the desired whirling motion.]

45,817.—Seeding Machine.—W. H. Crichton, of La Porte, Ind.:

I claim the rotating-pointed wheels, J, fitted on a shaft, I, within the seed box, H, with double-inclined planes, c c, between them and the wheels, working in recesses, b, in the rear side of the seed box, in combination with the fixed perforated plate, L, and the adjustable perforated plate, M, at the rear of the seed box, all arranged substantially as and for the purpose set forth.

[This invention relates to a new and improved broadcast seeding machine, and it consists in a new and improved means employed for discharging the seed and graduating its discharge.]

45,818.—Piano-fortes.—David Decker, of New York City:

I claim the construction of the agraff used in piano-fortes, substantially as herein described, whereby the face of its head, which is toward the hammers, may be flush with or project slightly beyond the edge or face of the wrest plank, while its screw is entirely inclosed in the wood of the said plank, and a sufficient supporting thickness of wood is left on the outer side of it to obviate the necessity of securing it into the iron plate.

45,819.—Pocket-book.—J. Fred'k. Dubber, of Brooklyn, N. Y.:

I claim a pocket-book, provided with a strip of steel, d, in the edge of its closing flap, c, as a new article of manufacture.

45,820.—Valves for Steam Engines.—Oscar T. Earle, of Springfield, Mass.:

I claim, first, A cylindrical slide valve, constructed with one or more ports through it, the said port or ports leading behind the ends of the valve into the steam chest, and at proper intervals coinciding with ports of the valve seat, substantially as and for the purposes set forth.

Second, The arrangement of ports, F and F', with piston, B, and valve, F, when operating substantially in the manner and for the purpose herein described.

Third, The arrangement of the ports, K and K', with the ports, I and I', and valve, E, when operating substantially as herein described.

45,821.—Machine for Clipping Hair or Wool from Animals.—Charles W. Emery, of Dorchester, Mass.:

I claim, first, A series of shear blades attached by pivots to a circular cutting plate, in combination with a circular undulating path cam, formed in such a manner as to give a vibratory motion to the shear blades, substantially in the manner and for the purpose herein described.

Second, I claim the device herein described for rotating the circular cutter plate, and locking and unlocking it at proper intervals, so that it may remain at rest while the cut is being performed, and again revolve while the blades are open, substantially as herein set forth.

45,822.—Tube Packing.—Samuel L. Fox, of Philadelphia, Pa.:

First, I claim packing pump tubes of oil and other wells, or other tubes, or pipes, by means of a movable packing case, with expansible sides, substantially as above described.

Second, I also claim the packing case, Q, constructed and operated substantially as above described.

45,823.—Harvesters.—Daniel D. Gitt, of Arendtsville, Pa.:

First, I claim mounting the friction roller upon the pin which unites the connecting rod with the sickle, when the said roller occupies a central position in relation to both, as shown and described.

Second, In combination with the above, I claim the employment of a box closed on top, for the double purpose of guiding and protecting the anti-friction connecting device, substantially in the manner described.

45,824.—Head Blocks for Sawmills.—Ira Hart, of Clarksburgh, West Virginia:

First, I claim the sliding knee, B, and clamp, H, in combination with the link, G, and shaft, E, or their equivalents, when constructed substantially as and for the purpose specified.

Second, The combination of the clamp, H, guide, I, and spring, M, when constructed substantially in the manner and for the purpose specified.

45,825.—Combined Seeding Machine, Roller and Drag.—W. H. Hartman and Samuel Sheller, of Fostoria, Ohio:

I claim the special arrangement of the jointed dray, F, lever, G, chains, g h, in combination with the seeding apparatus and adjustable rollers, B B, when arranged and operating as and for the purpose set forth.

45,826.—Machine for Loading Hay.—S. Ross Higgins, of Parma, Mich.:

First, I claim the turn table, G, placed on a mounted framing, A, and having a fork bar, J, connected to it, be operated by means of a rope, N, under the action of the draught animal, substantially as and for the purpose set forth.

Second, The guard, M, with its forward and rear bars, I' and I, and pivoted to the fork bar, J, in combination with the pivoted fork, K, and the rope, N, by tension, in which the guard is pressed down upon the hay, the whole arranged substantially as and for the purposes described.

Third, The caster wheel, C, when used in combination with the framing, A, turn table, G, fork bar, J, and fork, K, for the purpose described.

Fourth, The bar, Q, on the rope, N, in connection with the notch, o, in the shaft, H, and the rope, R, and spring, S, for the purpose set forth.

[This invention relates to a new and improved machine for loading hay on wagons, from cocks or windrows on the field, and it consists in applying an adjustable fork to a turn-table placed on a mounted frame, and provided with a guard and connected with a draught animal, in such a manner that the machine may be drawn from place to place with facility, the fork lowered and adjusted to its work, and then raised with its load over the wagon, and the former discharged into the latter, the labor being performed by the draught animal, the attendant simply guiding or manipulating the parts during the loading operation.]

45,827.—Reaping and Mowing Machines.—Oliver T. Holbrook, of Rushville, N. Y.:

First, I claim the combination with the main frame, c, constructed as described, of the secondary frame, D, and plate, B, arranged and operating in the manner set forth.

Second, The cutters, K, formed with a slit in the rear, as shown and described, when arranged upon and secured to the bar in the manner specified, whereby one part of the rear end thereof is elevated above the other, for the purpose and in the manner set forth.

45,828.—Manufacture of Steel.—Edward P. Hudson, of Washington, D. C.:

I claim the manufacture of cast-steel by combining decarbonized iron, prepared substantially as herein described, with pig or other carbonized iron, as herein specified.

45,829.—Tallying Machines for Measured Grain.—Sidney Hudson, of Milford, Mich.:

I claim the combination and arrangement of the several parts which produce the result, in the simple concise and effective form described.

I claim, first, The circular hopper slide, L, as attached to oscillating plate, B, which works dog, d, as described; also crank, C, the journal of which passes through a slot in plate, B, and is attached near the edge to ratchet, E, which is held from turning back by dog, S, which prevents slide, L, being closed without tallying, when the parts are arranged to operate as and for the purpose described. This combination will work several varieties of registers.

Second, I claim the combination of the ratchet wheel, E, with cog wheel, H, which works over the center of E; also cog wheel, x, which gears with H, and works near the edge of E, one cog at a time extending beyond the edge of E, which, at every revolution of E, comes in contact with stop, I, by which wheels, x and H, are moved forward one point on their respective dials.

I also claim spring, D, which is used to keep the machinery in place, when arranged in combination as and for the purpose herein shown and described.

45,830.—Cartridges.—Samuel Jackson, of Philadelphia, Pa. Ante-dated Jan. 3, 1865:

I claim the combined paper and metallic cartridge case, when constructed and arranged to operate substantially as set forth.

45,831.—Root-cultivator and Weeder.—Charles Jarvis, of Ellsworth, Maine:

I claim, first, Constructing the front edges, n, of the sides, g g, of the cutters, G, so as to project beyond the latter, substantially as and for the purpose described.

Second, The cutters, G, arranged as described, in combination with the bar, A, tongue, B, and wheels, F, substantially as and for the purpose specified.

45,832.—Bed Bottom.—Frank G. Johnson, of Brooklyn, N. Y.:

I claim the peculiar manner in which the cord is laced into the frame, A B C D, so that no two consecutive cords are parallel to each other, substantially in the manner and for the purposes herein set forth.

45,833.—Cultivators.—Adam Keck, of Montgomery, Ill.:

I claim, first, The attaching of the axles, C, of the wheels, B, to plates, D, secured to castings, E, at the under side of the framing, A, by means of bolts, a, passing through oblong slots, c, in the castings, substantially as shown and described, to admit of the wheels, B, being adjusted further forward or backward, to keep the machine in a proper equipoised state, as set forth.

Second, The plow beams, G G, provided at their front ends with upright bars, g, connected by joints, h, to the castings, E, and provided at their back ends with upright bars, H, having each a notch, i, to receive a catch, I, all arranged substantially as and for the purpose set forth.

Third, The springs, K, on the back part of the framing, A, in combination with the upright bars, H, of the plow beams, G G, as and for the purpose specified.

Fourth, The attaching of the plow beams, L L, by means of the uprights, M, and joints, j, to the pivoted plate, N, arranged on the framing, A, substantially as shown, to admit of the working or moving of the plows, Q, as set forth.

[This invention relates to a new and improved implement for plowing or cultivating corn and other crops which are grown in hills or drills, and it consists in a novel arrangement of the plows, or in the manner of applying them to the frame thereby, whereby they may be manipulated with the greatest facility while at work, and the invention further consists in an improved mode of attaching the wheels to the framing of the machine, whereby the former may be kept in a properly counterpoised state at all times, and the team relieved from any unnecessary downward pressure of the draught poles.

45,834.—Mode of Constructing Railroad Car Trusses.—Joel F. Keeler, of Pittsburgh, Pa.:

I claim the railway car truss, constructed and used substantially in the manner and for the purposes set forth.

45,835.—Feathering Paddle Wheel.—Geo. A. Keene, of Newburyport, Mass.:

I claim arranging the floats of a paddle wheel in pairs at right angles to each other, one at each end of a shaft passing through the center of the wheel, so as to present more area on one side of said shaft than on the other in order that the one float, entering the water flatwise, in passing through the same shall gradually turn and emerge edgewise, while at the same time it is turning the opposite float so that it shall enter the water flatwise, substantially as described.

45,836.—Securing the Necks to Door Knobs.—Thomas Kennedy, of Branford, Conn.:

I claim securing the neck to knobs substantially as and for the purpose herein set forth.

45,837.—Treadles for Operating Machinery.—John J Kimball, of Naperville, Ill.:

I claim the treadle, D, hung centrally on a shaft, a, provided with two pitmen, C C, which are connected to reverse cranks, B B, on the shaft, A, in combination with the foot piece, E E, hung on shafts, b b, which are fitted in the treadle, and all arranged to operate, substantially as and for the purpose specified.

[This invention consists in constructing a treadle in such a manner that the weight of the operator will be made subservient in actuating it, muscular force not being expended or required in any great degree.]

45,838.—Swinging Gear for Threshing Machines.—James Kline and Vroman Becker, of Chicago, Ill.:

We claim the combination of a stationary hanger with two sleeves and a socket, and a movable hanger or stirrup, with a perforated plate attached, and the hook, all combined and operating substantially as described.

45,839.—Fly Traps.—David Lake, of Smith's Landing, N. J.:

First, I claim the angular wheel, A a', operating in connection with the cap, D, and passage, E, to conduct the flies, in an undisturbed manner, to a point from which it will be impossible for them to regain their freedom, substantially as set forth.

Second, In combination with the aforesaid angular wheel, I claim the circular trough, G, adapted by its form to be readily inserted and removed, in the manner and for the purpose described.

Third, In combination with the said angular wheel, I claim the pivoted gate, H, weighted as and for the purpose described, and employed to cause the flies to leave the wheel, A, and enter the receiver, F, in the manner explained.

45,840.—Dress Facing.—James A. Mackee, of Boston, Mass.:

I claim the new manufacture or combination dress facing, as composed of the water proof or enameled cloth band, and the flexible linen band, or its equivalent, arranged and connected together in manner and to be used substantially as specified.

45,841.—Machine for Cutting Sheet Metal.—Hosea Low, of Waukon, Iowa:

I claim, first, The employment or use in machines for cutting sheet metal of two sets of cutters, F F, arranged in one and the same oscillating frame, E, or in two frames, the open ends of which point in the same direction, substantially as and for the purpose set forth.

Second, The combination of the cutter frame, E, with the slotted shaft, a, substantially as described, so that said frame can be lengthened and shortened from the center.

Third, The combination of the central shaft, a, with the adjustable U-shaped standard, D, and cutter frame, E, and clamps, H, substantially as set forth, so that the center around which the cutters turn can be brought in any desired position in relation to the clamps.

Fourth, The radial sliding arms, K K, applied in combination with the carriages, I I, movable center, a, and cutter frame, E, in the manner and for the purpose, substantially as set forth.

Fifth, The employment or use of a slide, M, carrying a pair of circular cutters, i and moving in rectilinear guides substantially as described, for the purpose of cutting off bevels, as for squaring plates of sheet metal.

Sixth, The gauges, L, applied in combination with the clamps, H, substantially as described, and acting in the double capacity of gages and of eccentric cams for compressing the clamps.

Seventh, The employment of the adjustable plate-holder, N, in combination with the cutters, F F, and cutter frame, E, constructed and operating substantially as and for the purpose set forth.

This invention relates to a machine for cutting sheet metal, in which two sets of cutters are arranged in one frame, or in two frames, the open ends of which point in the same direction, and

which turn on the same center, in such a manner that by the action of these cutters two consecutive circles are cut in one operation.]

45,842.—Automatic Folding Gates.—John B. Mahana, of Benson, Vt.:

I claim, first, The combination of the folding or rising and falling gate, with the trippers, D, for opening and closing the gate by the action of the wagon or other wheel in passing the gate, substantially in the manner and for the purposes set forth.

Second, I also claim the peculiar arrangement of eccentrics, I, wires, L, cords, G G', and pulley, H, for opening and closing the gate, substantially as described.

45,843.—Ladies' Breast Pads.—John A. Mason, of Brooklyn, N. Y.:

I claim the breast pads, constructed with the parts, A B and C, substantially as above described.

[This invention consists in an improvement in breast pads, whereby economy and simplicity of construction, and elegance of shape are attained in a high degree, and this article of a lady's attire is made less liable to the objection that it is injurious to health by reason of the thickness and solid character heretofore given to it.]

45,844.—Presses.—James A. McGillirrae, of Dyer, Ind.:

I claim, first, The employment or use of a cast-metal beater, I, provided with holes, b, to admit of the escape of air from the press box, substantially as set forth.

Second, The trip wheel, N, constructed and arranged substantially as shown, for operating the beater, I, in combination with toothed wheels, O and P, as described.

Third, The two levers, E E, in combination with the inclined plains, H H, for operating the follower, F, substantially as set forth.

[This invention relates to a new and improved press for baling purposes, and of that class which are provided with a beater for compacting in the press box the material to be pressed previous to the pressing operation.]

45,845.—Rotary Boilers for the Manufacture of Paper Pulp.—Harrison B. Meech, of Fort Edward, N. Y.:

I claim, first, The combination of the pipes, b' c c' and d', with their respective stop cocks, P N and O, with the pipe, a C, entering into the rotary, Y Y, in the manner and for the purposes above described.

Second, I claim the perforated cap, B, in combination with the steam pipe, A a a, passing out of the rotary through its journals, a', in the manner, and for the purpose above described.

Third, I claim the combination of the pipe, A a a, the steam chamber, K, the pipe, g', and the stop cock, M, in the manner and for the purpose above described.

45,846.—Manufacture of Prussian Blue.—John M. Merrymon, Indianapolis, Ind.

I claim the use of a solution of Bichromate of Potash and a solution of acetate of lead in the manner and for the purposes herein described.

45,847.—Sawing Machines.—Henry J. Miller, Shanesville, Ohio.

I claim the combination of the shaft, J, pinions, h i, suspending racks, H I, hangers, D E, slideways, b c, guides, d e, cross heads, l m, and horizontal saw, A, all arranged to operate as herein specified.

[This invention consists in the application of two pairs of slides suspended from vertically adjustable posts in combination with a saw secured to cross heads to which a reciprocating motion is imparted by head steam or any other suitable power in such a manner that a log placed under the saw is exposed to the full weight of said saw augmented by that of slides, cross heads and forks, and by these means the operation of sawing is effected in an expeditious and easy manner.]

45,848.—Fruit Box.—Edmund Morris, Burlington, N. J.:

I claim the above described method of constructing fruit boxes without the use of nails or glue, whether made of wood or other material, and of whatever shape.

45,849.—Ejectors for Oil Wells.—George M. Mowbray, Titusville, Pa.

First, I claim the frame constructed substantially as described with one or more stuffing boxes to receive the tube connecting with the blast pipes, substantially as described and for the purposes set forth.

Second, I claim the collar, a, forged upon or otherwise secured to the tube, A, in combination with the hollow sleeve screw, B, for the adjustment of the tube, A, substantially as described and for the purposes herein specified.

Third, I claim the hollow screw, B, and templet female screw plate, C, in combination with the tube, A, substantially as and for the purposes described.

Fourth, I claim the hollow cap, G, in combination with the blast tube, A, substantially as described and for the purposes explained.

Fifth, I claim the combination of a T, fitted with a cap, G, stuffing box, D, and lugs to receive bolts, c c, with templet and hollow screw substantially as described and for the purposes set forth.

45,850.—Machine for forging File Blanks.—Wm. S. Nicholson, Providence, R. I.:

First, I claim swaging and shaping a file blank or similar article by the method and on the principle substantially as described.

Second, The method substantially as described of regulating and varying the rate of speed at which the devices for swaging the metal shall travel, by means of an irregular surface, K, moving with the swages in combination with the mechanism by which such swages are moved as herein specified.

45,851.—Elevators.—A. B. Nimbs, Buffalo, N. Y.:

I claim a wrought iron elevator leg constructed of wrought iron angle bars, C, and connected and strengthened by wrought iron diagonal braces, D, or by sheet iron plates, L, the two trunks of the leg being connected at the top by the semicircular arches, c2 c3, and at the bottom by the cast iron foot box, A, substantially as described.

45,852.—Wire Fence.—Joseph W. Norcross, Middletown, Conn.:

I claim, first, the use in the construction of a wire fence of one continuous piece of wire for each section substantially as and for the purposes set forth.

Second, The pulleys, a b c d, attached to rigid posts, c c', and to movable posts, D D', and operating in combination with the wire, W, and with right and left handed screws or their equivalents substantially as and for the purpose described.

Third, The brackets, g', with oblique slots, h, applied to movable or rigid posts, E, and operating in combination with the wire, W, substantially as and for the purpose set forth.

Fourth, Casting the bearings of the pullies, a b c d, solid with the posts, C C' D D', substantially as and for the purpose described.

45,853.—Preparing Hay for Baling.—G. H. Nye, Monmouth, Ill.:

First, I claim the rollers, B C, when provided with flanges, e e, substantially as and for the purpose herein specified.

Second, The combination of flanged crushing rollers, B C, with the knives, g g, substantially as and for the purpose set forth.

45,854.—Manufacturing Screw Drivers.—George Parr, Buffalo, N. Y.:

I claim manufacturing screw driver blanks or blades and other similar tools, by the process substantially as herein described.

45,855.—Method of Preventing Oil-barrels, &c., from Leaking.—George T. Parry and William S. Warner, Philadelphia, Pa.:

We claim the employment of paraffine to prevent leakage from barrels and other vessels of wood.

45,856.—Water Gages for Steam Generators.—Townsend Poore, Scranton, Pa.:

I claim, first, The arrangement, consisting of the cock, F, plug, G c, flanged tail stock, C, segment pipe, D, and index hand, g; the whole being combined and fitted to the boiler substantially as and for the purposes herein described.

Second, So fitting the several parts of the apparatus together and to the boiler that the one plug, G c, answers the two fold purpose of opening or closing the cock, F, and of twining the segment pipe, C D, to any position desired in the manner herein described.

Third, The application of a hollow perforated vessel, H, to the hollow drain pipe of a try-cock substantially as described.

Fourth, The application of a cup, K, to the inner end of the discharge pipe, D, for determining the hight of water in the boiler when there is no pressure therein, substantially as described.

45,857.—Composition for Lining Barrels, &c., containing Petroleum.—Henry Preuss, New York City:

I claim a composition produced by combining litharge with glue or its equivalent with or without other materials, for lining barrels or other packages of oil.

45,858.—Fence Gates.—Fitch Raymond and August Miller, Cleveland, Ohio:

We claim the arrangement of the ring or hoop, D, with the groove, f, and gate, A, in combination with the rollers, e e, cord, d, and weight, when operating conjointly as and for the purpose set forth.

45,859.—Beehives.—Oliver P. Reeve, Tipton, Iowa:

I claim the arrangement of the comb frame and comb guides constructed as described in combination with the groove, i, in the side of the hive and the double inclined bottom, substantially as and for the purposes specified.

45,860.—Cultivators.—Cyrus Roberts, Three Rivers, Mich.:

I claim, first, The combination of the main frame, the shifting plow frame, the lifting lever, and the shifting machine arm, O P, with the driver's seat, when arranged for joint operation as described.

Second, The shifting foot lever, R, constructed and arranged to operate as and for the purposes described.

Third, The combination of the shifting frame, the plows, and the corn guard with the main frame when constructed and arranged in operating as described for the purposes set forth.

45,861.—Cultivators.—Cyrus Roberts, Three Rivers, Mich.:

I claim, first, The combination of the double ended shoves with their stocks, by means of the reversible swiveling brackets, e, and bolts, c, in the manner described, for the purpose of reversing the shovels when worn or injured, and of turning them sidewise to throw the earth more or less towards or from the plants as desired.

Second, The combination of the shovel stocks and shifting frame by means of the brackets, J, bolts, j3, and clips, j4, as described for purpose set forth.

Third, The combination of the shovels, the auxiliary or shifting frame, and the main frame when constructed and arranged as described for the purposes set forth.

Fourth, The combination of the plow stocks and shifting frame by means of the brackets, J, slots, j', and set screw, j, as and for the purposes described.

45,862.—Feeding Corn to Corn Shellers.—H. C. Robinson, Monmouth, Ill.:

I claim the employment or use of an endless apron or carrier in connection with a crib or corn receptacle, provided with removable slats or boards, d, at its bottom, substantially as and for the purpose herein set forth.

I also claim a crib or corn receptacle divided into a series of compartments and provided with a well hole, arranged as shown, when used in connection with the endless apron or carrier and the removable slats substantially as described.

I further claim the arrangement of the endless apron or carrier, E, with the bottom, i, of the box, F, and the spout, G, for the purpose of carrying off the loose or shelled corn as set forth.

[This invention relates to a new and useful device for feeding corn to corn shellers from cribs so as to avoid all handling or carrying of the corn from the place where it is stored to the sheller. The invention is more especially designed for shelling corn in large quantities for shipment from warehouses.]

45,863.—Baling Press.—Chas. H. Robinson, Bath, Me.:

I claim the combination of the levers, C, bars, D, ropes, F, and shaft, E, all arranged and applied to the follower, B, to operate in the manner substantially as and for the purpose herein set forth.

[This invention relates to a new and improved baling press of that class in which levers and a windlass are employed for elevating the follower.]

45,864.—Shifting Gear.—Charles D. Rogers, Utica, N. Y.

I claim the lever, I, with cam, J, attached, provided with two notches, f f', in combination with slide, E, connected with the pinion, C, and provided with the pin, K, and the sleeve, H, provided with the pin, K', and arranged with the spiral spring, G, all arranged to operate in the manner substantially as and for the purpose specified.

I claim the lever, I, and cam, J, in combination with the slide, E, provided with two pins, K K', either or both being fixed or movable, when said pins are arranged so as to engage with or lock into the notches, f f', as set forth.

I also claim the flange, L, provided with the slot, i, when arranged in relation with the box, M, substantially as and for the purpose specified.

[This invention relates to a means whereby the pinion which gears into the large spur wheel of reaping and mowing machines, may be moved or adjusted so as to render the long or crank shaft, and consequently the sickle, operative or unoperative as desired.]

45,865.—Loading and Unloading Hay Wagons, &c.—Seymour Rogers, Pittsburgh, Pa.:

I claim the turning upright, B, placed at the rear part of the wagon and composed of two parts, a b, connected by a joint in combination with the windlass, E, arm, D, and rope or chain, F, all arranged to operate substantially as and for the purpose herein set forth.

I further claim the same device for binding the hay on the wagon in combination with windlass, H.

[This invention relates to a new and improved loading and unloading attachment for wagons and has for its object facility in performing the work above specified as well as the securing of the load on the wagon.

45,866.—Cultivators.—E. H. Sawyers, Orleans, Iowa:

First, in combination with the lever, L', and shaft, L, I claim the oblong slot, i, formed and employed in the manner and for the purpose specified.

Second, I claim the described arrangement of the adjustable cultivator frame, I I' I2 I3, the brace rods, h, angular shaft, M, and draught rod, N, the whole being employed in the manner and for the purposes set forth.

45,867.—Device for Producing Motive Power by the Vertical rise and fall of the Tide.—Augustus W. Scharit, St. Louis, Mo.:

First, I claim the combination of a float, screw shaft and the valve or valves for filling and emptying the same substantially as shown and described.

Second, I claim the combination of a float with the double rack for communicating the power substantially as shown and described.

Third, I claim the combination of a float with the single movable rack for communicating power substantially as shown and described.

Fourth, I claim the double-sided valves substantially as shown and described.

Fifth, I claim the combination of the screw cog wheels, ratchets and pawls substantially as shown and described.

Sixth, I claim the combination of the single rack and double ratchets and pawls substantially as shown and described.

Seventh, I claim the arrangement of the double or twin pairs of ratchets and pawls substantially as shown and described.

Eighth, I claim the combination of the double rack and wheels with the lever and screw and slotted rod and screw attached to frame guide substantially as shown and described.

Ninth, I claim the endless chain pulley, drum or windlass, in combination with the endless band or chain rods, hooks, pulleys, beam and hinged drop substantially as shown and described for loading and unloading vessels and for other purposes.

45,868.—Billiard Indicator.—R. Schmitz, Brooklyn, N. Y.:

I claim, first, The notched shaft, E, in combination with the slide, C, cam rods, I I, index, c, and scale, a, constructed and operating substantially as and for the purpose set forth.

Second, the cam rods, I I', in combination with the notched shaft, E, slide, C, and spring catch, f', constructed and operating in the manner and for the purpose substantially as described.

Third, the swinging bar, m, and cam, l, in combination with the slide, C, and registering device, v u, constructed and operating substantially as and for the purpose specified.

[The object of this invention is to protect the interest of the proprietor of a billiard saloon by compelling the players to play each game right straight through, and preventing them from pushing the index back for the sake of prolonging a game.]

45,869.—Drills for Boring Mills.—John Sheffield, Putneyville, N. Y.:

I claim a drill for artesian wells composed of the chisel bars, C D, and bent or oblique arm, B, of the drill rod, A, connected together by pivots, and arranged substantially as and for the purpose herein set forth.

[This invention has for its object the constructing of a drill in such a manner that it will be capable of expanding and enlarging the bore or shaft of an artesian well at its bottom. The invention more especially designed for enlarging the bottoms of oil wells so as to open more veins than the ordinary bore or shaft will intersect and cause the well to be more productive than it otherwise would be.]

45,870.—Rail Road Axle Boxes.—S. T. Shelley, Louisville, Ky.:

I claim, first, hinging the covers of axle boxes by means of a cam-joint hinge constructed substantially as described working on a reciprocating spring bolt or its equivalent.

Second, I also claim making an enlargement, e, in the hinge, A, for receiving the bolt head and spring, f, in combination with the reciprocating bolt, C, and the hinge, A, for the purpose of protecting the spring and bolt from dirt and other obstructions substantially as described.

45,871.—Rail Road Cars.—Sidney Skillman, Jersey City, N. J.:

First, In combination with the placing of the boiler and engine of a locomotive car on a truck in such manner that the boiler is received within a compartment at one end of the car, I claim the construction of the car with such an opening in the bottom or floor and a door or other suitable opening in one end as to permit the boiler to pass out with the truck when the latter is run out from under the car, substantially as herein described

Second, The stationary platforms arranged within the car body and in relation to the boiler and truck, D, substantially as herein described to serve as standing places for the engineer and as a protection against injury in case of getting off the truck.

Third, In a locomotive car having the engine and boiler detachable, I claim attaching the smoke pipe permanently to the car substantially as and for the purpose herein described.

45,872.—Device for Shrinking Tire.—C. V. Statler, Wataga, Ill.:

I claim the two bars, B C, one, B, fitted in the bed, A, by a pivot bolt, c, and the other, C, arranged so as to slide therein, and the two bars connected at their lower ends by one or more bars, D, and provided above the bed with the dies, f f, in combination with the clamps, F F, pivoted to the bars, B C, the spring, E, and lever, J, provided with the cam K, all arranged to operate in the manner substantially as and for the purpose set forth.

[This invention relates to a new and improved implement or device for upsetting or contracting tires for wheels so that the frame may, in case of the wheels shrinking, be reduced in diameter so as to be adjusted snugly on the latter without the trouble of cutting and rewelding a comparatively tedious and expensive process.]

45,873.—Weighing Bucket.—David D. Stelle, New Brunswick, N. Y. Ante-dated Nov. 14, 1862:

I claim, first, The weighing attachment, b c, or its equivalent in combination with the bucket, A, and its bail, B, constructed and operating substantially in the manner and for the purpose described.

Second, The arrangement of springs i, and spring stop, g, in combination with the hinged bottom, D, of the bucket, A, as and for the purposes specified.

Third, I claim the arrangement of the rings, R and Q, grinding the string, P, as described within.

45,874.—Sleds.—Judd Stevens, of Marengo, N. Y.:

I claim in connecting the bolster, C, with the way, a, by means of the rounded bearing, c, fitting in the depression, b, for the purpose of allowing a free turning or oscillating movement of the bob, and employing the friction rollers, d f, to obviate the friction in the end movement of the bob, in adapting itself to an irregular surface, the whole arranged combined and operating substantially as herein set forth.

45,875.—Water Wheels.—Robert Stewart, of Fultonham, N. Y.:

I claim the buckets, d, having the vertical, transverse oblique and inclined surfaces, e f f, and attached to the case, b, with the bands h h, encompassing the inclined surfaces, f f, in connection with the scroll, A, all arranged substantially as set forth.

45,876.—Artificial Arms.—Ignatius Stoffel, of Washington, D. C.:

First, I claim the peculiar construction of my artificial hand and wrist joint, the palmar region of which is represented by a hollow metallic case, with an elastic palm; the phalanges, t t t t' t' t' t', and t'' t'' t'' t'', operated by the springs, p p p p, representing the four tendons of the flexor profundus, and articulated by the guide rings, u u u u, representing the tendinous bands at the corresponding places of the natural hand; also, the hinged thumb and the thumb lever, q, representing the flexor brevis pollicis, in combination with the stirrup, l, and the spring, m, by which arrangement the elasticity of the cartilages of the natural hand is secured, as described within.

Second, I claim the peculiar construction of rod, i, and ratchet bar, K, in combination with the fork lever, a, fastened to the elbow, and the construction and arrangement of the trigger, d, with catch, e, and trigger spring, f, as specified and for the purpose set forth.

45,877.—Digging Machine.—Charles H. Stratton, of Munroetown, Pa.:

I claim the employment or use in a steam digging machine of a series of spades, arranged in such a manner as to penetrate the earth, rise or swing upward with their load, and then turn one-quarter of a revolution to discharge the same, substantially as herein shown and described.

I further claim the slots, g, in the shafts, F F, having spiral outer ends, h, in connection with pins, i', fitted in the bearings, e, and passing into the slots, g, the shaft, G, to which the bearings, e, are attached, and the crank shaft, B, all being arranged to operate the spades, E E', as set forth.

[This invention relates to a new and improved machine for spading the earth, with steam as a motor, and it consists in the employment or use of spades or forks of any suitable or desired number, arranged in such a manner that they will, as the machine is drawn along, penetrate the earth and lift and turn over the same, similar to hand digging, and perform the work equally as well.]

45,878.—Ovens for Converting Iron into Steel.—William A. Sweet, of Syracuse, N. Y.:

I claim, first, The combination and arrangement of the heating furnaces with the converting chamber, A, substantially as described.

Second, The dead holes, H, in combination with the heating furnaces and chamber, A.

Third, The boshes or angular projections, m m, as related to the bottom of the chamber, A, and the dead holes, H.

Fourth, Gradually diminishing the fire spaces, S S, from the boshes, m m, to the openings, o o o, at the top of the chamber, A.

Fifth, The openings, o o o o p p p p, substantially as described and for the purposes set forth.

Sixth, Supporting the upper edges of the chamber wall from external pressure, substantially as described and for the purposes set forth

45,879.—Manufacturing Cutter Bars for Harvesting Machines.—George B. Taylor, of Worcester, Mass.:

I claim forming the holes for the rivets or bolts, by which the cutters are fastened to the cutter bars in reaping and mowing machines by punching, in combination with holding the cutter bar during the operation, so that it can not elongate in the direction of the heel of the bar, for the purposes herein set forth.

I also claim the use of the combined pattern and supporting bar, B, as shown and described, to aid in the operation of punching cutter bars, substantially in the manner herein described.

I also claim, in combination with the pattern or supporting bar, B, the bolt, d, and stay clamps, C, for holding the cutter bar, substantially as herein set forth.

45,880.—Harness Saddle Trees.—Samuel E. Tompkins, of Newark, N. J.:

I claim the two bearings, A A, connected together by a thin strip or plate, B, made of convex form at their under sides, to correspond to the shape of the back of the animal, and having a corresponding concave surface at their upper sides, when said bearings thus formed and connected together are provided with nuts, a, at their upper surfaces, to receive the turret screws, b, and all used in connection with the metal jockeys, E E, flaps, C, and back board, F, substantially as herein set forth.

45,881.—Stove Grate.—George Vander Heyden, of Troy, N. Y.:

First, I claim the bed plate, B, when constructed respectively at each end of said plate, with the direct bearings, a a, and reverse bearings, b b, in the manner substantially as herein shown, for the purpose of supporting and operating stove grates, in the manner herein set forth.

Second, In combination with the bed plate, B, I claim the fire grate, C, when constructed substantially in the manner as herein described and shown, so that the said grate can be operated in combination with said bed plate, fully in the manner and for the purposes as herein specified.

45,882.—Side-hill Plows.—Nathan Vars, of Newmarket, N. J.:

I claim the employment or use in a side-hill plow, of a subsoil share, G, having its standard, F, attached to an adjustable or swinging arm, G², arranged substantially as shown, to admit of the subsoil share being adjusted to either side of the plow beam, to suit the position of the mold board, C, and share, D, as set forth.

[This invention relates to a combination of a subsoil and a side-hill plow, and it consists in having the subsoil attached to an adjustable standard at the rear of the plow beam, and arranged in such a manner that the subsoil share may be adjusted either to the right or left side of the plow beam, according to which side the mold board and share of the sod plow is adjusted, thereby admitting of a combination of the two plows, and in such a manner as to insure a perfect working of both.]

45,883.—Stove Grate. Geo. W. Walker, Boston, Mass.:

I claim a stove grate having capabilities both of horizontal reciprocation, and of vertical swinging movement, when the grate is hung at its rear side to allow these movements, substantially as set forth.

And in a grate so constructed, I claim giving to each end bar of the grate such width and disposition that in its sliding movement under the stove lining, the capability of free movement of the grate is maintained, substantially as described.

45,884.—Pen-holder.—Sylvenus Walker, Boston, Mass. Ante-dated Sept. 11, 1863 :

I claim the hollow silvered glass pen-holder, sealed up and protected as and for the purposes set forth, as a new and highly ornamental manufacture.

45,885.—Grain Binder.—Saml. Jacob Wallace, Carthage Ill.:

I claim, first, The arm, Z, of wheel, O, sliding over slot of wire holder, Y, substantially as and for the purpose specified.

Second, The binder, G, in combination with a movable arm, F, or other equivalent movable part, so that the binder may be made traveling in relation to platform, A, substantially as and for the purpose specified.

Third, The combination of the rack, K, and twister, I, substantially as and for the purpose specified.

Fourth, The rack, K, arranged on frame, Q, substantially as and for the purpose set forth.

Fifth, The compresser shoe, V, arranged on frame Q, substantially as and for the purpose specified.

Sixth, The slotted wire holder, Y, bent or recurved, substantially as and for the purpose specified.

45,886.—Machine for Rolling Metals.—Hervey Waters, Northbridge, Mass.:

I claim the arrangement of a single yoke with its appurtenances and connections, substantially as and for the purposes specified.

45,887.—Adjustable Chair.—Theos. Weaver, Harrisburg, Pa. :

I claim, first, The construction of the arm frame, C C F F', and its combination with the haunch, U, or with the haunch, X, and its collar, K, and pin, when so constructed as to inclose the back, A, and

Second, The combination and arrangement of the back, A, which is provided with the arm rests, D D, the tenons, S S, the ratchets, H, hooks and staples, O O', with the seat, B, which is provided with the arm rests, E E, the tenons bearing on R, the ratchets, J, when operated by the haunch, U or X, substantially in the manner as and for the purposes herein shown and described.

45,888.—Thill Attachment.—R. B. Willis, of Rochester, N. Y.:

I claim the combination and relative arrangement of the set screw, s, frictional plate, a, and the thill iron, B, with the bolt, b, and jaws, D, of the clip, the parts being constructed as and for the purposes shown and described.

45,889.—Mode of Operating Switches.—J. F. Wilson, Boston, Mass., and James C. Bartlett, Charlestown, Mass.:

We claim the employment of a shipping wedge connected with and operated at will from the car, and so as to enter between the switch and main rails of a track, substantially as set forth.

We also claim the arrangement of the shipping wedges for moving the rail in opposite directions, as shown and described.

45,890.—Derrick and Horse Power.—Dan. Woodbury, Rochester. N. Y.:

I claim, first, The employment of side braces, J, they being constructed, arranged and applied to mounted powers, substantially in the manner shown and described and for the purpose set forth.

Second, The peculiarly constructed stake iron, P, in combination with the double brace bars, J, for the purpose of holding the stake when driven more securely in position.

Third, Attaching the inner end of the sweep brace, I, to the bracket, R, or to the rim of the wheel, W, as and for the purpose shown and described.

Fourth, The combination and arrangement of the angle iron, D, with the joint plate, E, and the frame, A, of this class of horse-powers, as shown and described and for the purpose specified.

Fifth, Fitting the box, v, between the jaws or wings, n, of the joint plate, E, so as to have but a line of bearing vertically between the parts, as and for the purpose specified.

Sixth, The combination and arrangement of the rope spool or windlass, and the jack, G, constructed as shown and described, with the mounted powers, as and for the purposes herein set forth.

45,891.—Stake-holder for Railroad Cars.—A. R. Burdick (assignor to himself and J. D. Foster), Racine, Wis.:

I claim the box, A, provided with the flange, d, having a notch or recess, e, and two projections, f f, one or both in combination with the collar, C, provided with the flange, g, internal elliptical opening and the projection, h, all arranged substantially as and for the purpose herein set forth.

45,892.—Cultivating Land by Steam.—John Fowler, Jr., Cornhill, England, assignor to W. P. Tatham, Philadelphia, Pa.:

I claim the combination herein described, whereby the power of two engines, situated on distant headlands, is simultaneously employed in giving motion to an agricultural implement by an endless rope, in manner substantially as described, to haul the agricultural implement, alternately to and from each head land, as herein explained.

45,893.—Hand Stamp.—George J. Hill, Buffalo, N. Y., assignor to H. G. Leisenring, Philadelphia, Pa. :

I claim, first, The yoke, F, constructed and arranged in respect to the plates, E and G, substantially as specified.

Second, The bed, composed of the soft rubber ring, I, metal plate, J, and plate L, of harder rubber, leather or other equivalent material, the whole being confined in a recess in a base plate, B, and arranged beneath the stamp, as described, for the purpose specified.

45,894.—Calipers.—F. O. Washburn (assignor to himself and John C. Scott), Millville, Mass.:

I claim the index, C, and graduated plate, D, when arranged and applied to the calipers, substantially as and for the purpose specified.

[This invention consists in constructing the calipers in double form, or so as to have both ends capable of being used to gage or measure with, the prongs at one end being curved to measure the exterior of shafting, and the prongs at the opposite end being straight to measure the diameter of a hole or bearing to receive the shafting, both measurements being obtained at once or at the same time.]

45,895.—Revolving Grate.—P. J. Boris, Halifax, Nova Scotia :

I claim the revolving grate, D, arranged in the lower part of the flue or chimney, A, in combination with the eccentric, F, placed on the axis or shaft, C, of the plate, B, and arranged relatively with the dampers, E E, to operate automatically by the turning of the plate, B, and grate, D, substantially as described and represented.

45,896.—Automatic Hammer.—Wm. D. Grimshaw, Birmingham, England :

I claim, first, The system of employing a reservoir between the pump or pumps and the hammer cylinder for holding the compressed air, the reservoir to be formed in the framework of the machine.

Second, The combination of the adjustable but otherwise stationary valve, d' d', the slide valve, k, the cylinder, f, the piston, g, the piston rod, h, and the hammer, i, substantially as set forth.

Third, The combination of the valve rod, w, the friction wheel, y, the sliding friction wheel, b', and the shaft, d, substantially as and to the effect hereinabove set forth.

Fourth, The combination of the reservoir, b, the pump, o, and the stock-cock, t, as described.

Fifth, The arrangement described, of the pump, o, reservoir, b, friction wheels, b' and y, valve rod, w, valve, k, cylinder, f, and piston, g, by which they are made to operate in relation to each other, substantially as set forth.

45,897.—Gang Plow.—Thomas Short, Fairmont, Ill. :

I claim the arrangement of the double crank-shaped connecting rod, G, devices, e e, links, a' a', beam, E, lever, H, and post, I, the whole being employed for joint operation, in the manner and for the purpose specified.

45,898.—Rifling Breech-loading Fire-arms.—Hiram Berdan (assignor to Levi P. Morton, Trustee of Hiram Berdan, Abia A. Selover and Wm. B. Benson), New York City :

I claim the rifling or grooving of the counter bore of breech-loading fire-arms, substantially as and for the purposes herein shown and described.

45,899.—Breech-loading Fire-arm.—Hiram Berdan (assignor to Levi P. Morton, Trustee of Hiram Berdan, Abia A. Selover and Wm. B. Benson), New York City :

I claim, first, The protecting plate, E, swinging in a plane transverse to the barrel in combination with the ring, G, substantially as and for the purposes set forth.

Second, The protecting cover, I, and protecting plate, E, in combination with the latch, D, as herein specified.

45,900.—Suspended.

45,901.—Attaching Bayonets to Fire-arms.—Hiram Berdan (assignor to Levi P. Morton, Trustee of Hiram Berdan, Abia A. Selover and Wm. B. Benson), New York City :

I claim placing the bayonet blade and shank upon the underside of the barrel, in combination with the ramrod, substantially as and for the purpose herein shown and described.

RE-ISSUES.

1,848.—Artificial Gums and Palate.—John A. Cummings, Boston. Mass. Patented June 7, 1864 :

I claim the plate of hard rubber or vulcanite or its equivalent for holding artificial teeth or teeth and gums, substantially as described.

1,849.—Tanning Hides and Skins.—Simon H. Kennedy and Henry L. Elder, Philadelphia, Pa., assignees of Wm. Fields and Israel Townsend, Wilmington, Del. Patented June 7, 1864 :

We claim, first, The employment or use in tanning hides or skins, of a current of compressed air applied to the hides or skins in combination with the ordinary or other tanning liquors, in the manner and for the purpose substantially as specified.

Second, The perforated pipe, E, extending through the air-tight vat, A, near its bottom, in combination with an air pump and loaded valve, all constructed and operating in the manner and for the purpose substantially as herein shown and described.

1,850.—Lantern.—John H. Irwin and James F. Griffin, Chicago, Ill., assignees of John H. Irwin, aforesaid. Patented Nov. 4, 1862 :

First, I claim the cap or deflector, H, arranged below the top of the wick tube and operating substantially in the manner and for the purposes herein specified and set forth.

Second, I claim the combination of the jacket, G, and deflector, H, and forming the deflected air passage with the holes, e, all arranged and operating substantially as and for the purposes herein shown and described.

Third, I claim, in combination with the jacket, G, deflector, H, and holes, e, the prolonged oil cup, E, and vertical plates, d, arranged and operating substantially as and for the purposes described.

1,851.—Car Wheel.—Thomas Sharp, Chicago, Ill. Patented Sept. 29, 1863 :

First, I claim the construction of a car wheel, the combination of the two flanges, a d, with the broad tread described, when arranged and operating with respect to the different gages herein specified, substantially as delineated and set forth.

Second, I claim constructing said car wheel of a single casting, in the manner and for the purposes herein set forth and described.

EXTENSIONS.

Two and Three-ply Carpets.—Alexander Smith, West Farms, N. Y. Patented Dec. 10, 1850. Extended Dec. 10, 1864 :

I claim the weaving of two or three-ply ingrain carpets, the employment of parti-colored warp and weft, operated by the jacquard or other mechanical means to form the figure, when the same colors in the warp and in the weft are caused to combine together to form the same colored figure in the fabric, substantially as described.

Vat for Tanning Hides.—Lewis C. England, Williamsburgh, N. Y. Patented Dec. 24, 1850. Extended Dec. 17, 1864 :

I claim the slats, as described, in combination with the vat and the handler, substantially in the manner and for the purposes herein set forth.

Trigger-operating Revolving Fire-arm.—Stanhope W. Marston, New York City. Patented Jan. 7, 1851. Re-issued July 26, 1859. Again Re-issued Aug. 21, 1860. Extended Jan. 7, 1865 :

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 fixed 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 mainspring, for the purpose of securing steadiness of aim and greater ease in firing, and also allow the recovery of the trigger after firing, for repeated action.



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.

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

The Patent Laws, enacted byCongress 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.

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.

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.

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

Horse-power.—It is a fixed rule of this, and all other well-regulated newspaper establishments, to disregard all anonymous letters.

J. W., of Conn.—You can sell an article before applying for Letters Patent without afterward invalidating your claim, but we do not think it a safe practice to adopt.

G. W. G., of Me.—On page 287 of our last volume you will find a description of an ice-making machine in practical use in England. The cooling is effected by the expansion of air previously compressed by a steam engine. It was considered a triumphant success to make one tun of ice by the expenditure of one tun of coal. The first stroke of an air pump, in exhausting a receiver, covers the interior surface of the receiver with a film of moisture. We do not find the data for filling your table.

R. H., of N. Y.—Baryto-celestine, a mineral which contains 35 per cent of sulphate of baryta, is found on Drummond Island, Lake Erie, and at Kingston, U. C. We are not aware that it is worked in this country. At Pittsburgh, Pa., large quantities of caustic soda are prepared, and sold under the name of concentrated lye.

D. T., of Mass.—You can not drill holes in glass with a common drill. They are usually made by a steel tool, like a punch in form, or flat on the end. The cutting is done by fine sand or emery. Wheeler & Wilson drill the glass in their cloth-pressers with a tool like the one mentioned above, in connection with diamond dust. If you have many holes to drill it would pay to buy some diamond dust. Large holes in glass can be made by a copper tube and fine sand or ground glass. The ground glass can be procured at druggists.

T. G. R., of N. Y.—The best book for your purpose is the "Practical Draughtsman." Address H. C. Baird, No. 406 Walnut street, Philadelphia, and he will send it by return mail.

D. C. D., of U. S. N.—Stubbs's tools can be procured of any first-class hardware store in this city. We are not engaged in the commission business. You had better write to some friend in this city to procure what you desire. Subscriptions received.

A. W. S., of Mass.—The harmlessness of pure nitrous oxide has been pretty fully discussed in our columns.

E. L., of N. J.—Plaster casts are taken from the faces of living persons in the manner you suppose. Tubes to breathe through are inserted into the nostrils, and the moistened plaster is then spread over the face and head. The velvet on wall paper and toys is prepared by cutting waste velvet into dust; it is velvet shoddy.

A. S. R., of N. H.—The best way to stop the leak in your boiler is to put a plate over the crack. All other expedients are shiftless and only temporary.

J. R. M., of Tenn.—There is no work on the locomotive link or link motion. Discussions of it can be found in Bourne's Catechism and Camdin's Practical Engineering, Main and Brown's Marine Engine, etc. The link used on Rogers's patent is, we believe, one patented by Uhry and Lutgens, and if the radius is struck from three different points, as you say, it is for some reason best known to the patentees. We see no object in it.

Gas Blow-pipe, Buffalo, N. Y.—Your letter contained no signature, and we cannot, therefore, reply to your inquiry by mail. The invention seems to embrace novelty, and we think a patent can be secured for it.

D. H. S., of N. Y.—If you are distilling pine wood to obtain turpentine the acid which troubles you is doubtless acetic acid. Your proper remedy is to make your retort or still of cast-iron instead of wrought-iron.

M. V. B. P., of Canada East.—You can procure plumbago suitable for electroplating of Smith & Butler, No. 48 Broome street, New York. A good work on electro-metallurgy is Smee's, published by John Wiley, No. 535 Broadway, New York. The pressure of water at a great depth may force a cork into a bottle, and yet the water may not be sensibly compressed by the pressure.

T. E. F., of N. H.—The pressure at the bottom of a boiler is the same as at the top.

A Constant Reader, of N. Y.—It is a common practice with good cooks to bake the undercrust of mince, as well as of other pies, before the pie is filled.

J. A., of N. J.—The ports for your 6-inch cylinder should be four inches long by one-half inch wide.

C. E., of Pa.—When a horse is employed in moving a machine in a circular path the diameter of this path should not be less than thirty feet, but forty feet would be better.

O. B. M., of Mass.—The comparative economy of turbines and breast-wheels has been already fully discussed in our columns, but we should still welcome any new facts or ideas bearing upon the subject. There are some of the turbines you speak of at Woonsocket directly under Mr. Harris's eye, and he has doubtless considered their advantages. We would be pleased to illustrate Mr. Boyden's wheel.

Y. N., of N. Y.—The effects of adding large amounts to our specie circulation has been plainly shown since the discovery of the California mines. All except our share of the increased currency of the world goes abroad and is distributed among all nations. Our paper circulation does not go abroad, because foreigners will not take it. Some values adjust themselves more slowly to inflations of currency than others; among the slowest are wages, farms and Government bonds. It is the opinion of this writer that Government could have obtained the means to carry on the war with far greater ease if specie payments had been maintained.

J. H. M., of N. Y.—The preparation of India-rubber for vulcanizing is a complicated process of cutting, washing, grinding and kneading. It was fully described and illustrated in the first volume (New Series) of the SCIENTIFIC AMERICAN, pages 169 to 176.

H. S., of S. C.—You had better advertise your invention for removing scale from boiler tubes through our columns We do not undertake to negotiate the sale of inventions.

S. L. B., of Geo.—You can obtain drawing instruments at Messrs. B. Pike & Sons', No. 518 Broadway, New York.

R. E., of ——.—India-rubber can be dissolved in spirits of turpentine or naphtha, and it can be hardened to various degrees by sulphur and heat, with the addition of lime and other substances.

L. M. M., of Mass.—The action of drying substances on paint is mysterious. We cannot tell you how to prepare oil with black oxide of manganese in such way as not to have it become thick.

H. B., of Wis.—We do not think the artificial ears to which you refer amount to much.

Money Received

At the Scientific American Office, on account of Patent Office business, from Wednesday, January 4, to Wednesday, January 11, 1865:—

A. M. W., of N. Y., $12; J. W. P., of Mo., $30; W. H., of Del. $50; H. A. R., of N. Y., $25; S. & S. of Ohio, $20; G. S., of N. Y., $20; W. L., of N. Y., $45; J. H. P., of N. Y., $22; R. A., of Ohio, $40; R. S. L., of Ill., $20; S. Van S., of N. J., $15; L. C. F., of Ill., $51; J. T., of N. Y., $45; P. C. P., of Ill., $70; W. A. H., of Ind., $45; H. W., of Wis., $20; J. H. D., of N. J., $15; B. McG., of N. Y., $20; F. & B., of N. Y., $15; G. F. J. C., of N. J., $30; H. H., of N. Y., $15; J. H., of N. Y., $30; J. A. L., of N. Y., $30; C. M., J., of N. Y., $34; J. E. S., of N. Y., $30; H. K. J., of Conn., $45; J. P. G., of N. Y. $40; P. & B., of Pa., $45; K. & L., of Mass., $20; J. S. L., of N. Y., $15; M. B. D., of N. Y., $40; A. R. J., of N. Y., $15; P. C., of Ill., $20; E. S., of N. Y., $20; F. J. E., of Ill., $20; H. B., of Iowa, $15; B. K., of Penn., $45; J. L. H., of Conn., $15; T. R., of N. Y., $41; P. W., of N. Y., $15; W. W. S., of U. S. N., $22; T. S. & W., of N. Y., $37; J. H. H., of N. J., $25; J. J. A., of N. Y., $30; L. B. H., of Mass. $48; W. G. A. B., of Del., $40; H. E. G., of N. Y., $20; J. T., of N. Y. $41; F. W. C., of N. Y., $15; W. T., of Ill., $20; C. D., of N. Y., $20; E. F., of N. Y., $15; T. D. E., of N. J., $20; R. K., of Ill., $20; N. De LaP., of Ohio, $16; J. W., of N. Y., $45; H. B., of N. J., $15; I. M. M., of Conn., $45; I. W. B., of N. Y., $20; J. F. R., of Pa., $20; C. E. B., of Mass., $16; J. W. F., of Cal., $20; O. W. K., of Wis., $25; J. M. R. of N. J., $15; H. L. B., of Pa., $15; M. B. W., of Ky., $16; C. S. S., of N. J., $15; P. G., of Pa., $25; A. J., of Pa., $16; A. L. B. of Minn., $25; L. R., of Ill., $16; P. J. C., of Conn., $50; G. L. M., of N. J., $25; B. & H. of Mass., $22; S. B. H., of Pa., $10. P. & K. of Pa. $275; J. H. O. N., of Pa., $25; E. E. S., of U. S. N., $30; C. F. C. of Conn., $15; E. B. T., of Mass., $20; R. H. & J., of Conn., $10; J H., of Pa. $16; C. J. F., of Iowa, $15; H. R., of Ill., $15; D. T., of Ohio, $10; H. H. of Iowa, $16; D. G. F., of Wis., $25; J. H. C., of Mass., $25; J. H. G., of Ohio, $16; M. H., of Mich., $25; J. C. of R. I., $20; L. H. L. of N. Y., $16 F & L., of Me., $25; W. W. T., of N. Y., $16; G. L. D., of N. Y., $15; J. F. W., of N. H., $25; T. J. L., of R. I. $140; W. & H., of Ill., $16; G. W. B., of Conn., $15; J. A. R., of Pa., $25; G. W. S., of Pa., $20; H. K., of Iowa, $10; W. L. C., of Wis., $25. J. S., of N. Y., $25; F. B., of Iowa, $20; J. B., of Ill., $15; G. W. J., of Mass., $30; H. R. A., of Ill., $20.

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. 4, to Wednesday, Jan. 11, 1865:—

T. S. & W., of N. Y.; (3 cases) J. H., of N. Y.; J. H. H., of N. J.; H. A. R., of N. Y.; W. H., of Del.; R. A., of Ill.; J. J. Jr., of Ms.; (4 cases); J. M. C., of Mass.; J. I., of N. Y.; P. G., of Pa.; E. B T. of Mass.; E. E. S., of U S. N.; O. A., of Cal.; G. W. J., of Ms.; P. E. P., of France; W. H. H. of Ohio; J. W., of Wis.; J. W. P., of Mo.; C. D., of Canada; J. J. A., of N. Y.; J. T., of N. Y.; J. T., of N. J.; D. G. F., of Wis.; J. L. of Conn.; J. A. R., of Pa.; D. T., of Ohio; O. W. K., of Wis.; A. L. B., of Minn.; J. B., of Ill.; D. A. B. S., of France; F. & L., of Me.; R. & H. V. F., of Ind.; A. M. W., of N. Y.; J. A. L., of N. Y.; J. E. S., of N. Y.; C. M. J., of N. Y.; J. H. P., of N. Y.; T. R., of N. Y.; M. & H., of N. J.; L. R., of Ill.; G. W. S., of Pa.; H. R., of Ill.; J. F. W., of N. H.; J. H. O'N., of Pa.; W. L. C., of Wis.; M. H., of Mich.; F. M. L. D., of France; J. K., of Wis; T. J. L., of R.I. (2 cases).

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.

Back Numbers and Volumes of the "Scientific American."

VOLUMES III., IV., VII., X., AND 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., V., VI., VIII. and IX., are out of print and cannot be supplied

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.

ASSISTANT QUARTERMASTER'S OFFICE, No. 18 STATE-ST., NEW YORK, Jan. 1, 1865.

CAVALRY AND ARTILLERY HORSES WANTED.—I will purchase in open market all horses that may be presented and pass inspection at the Government stables on Thirty-fifth street, near Tenth avenue, until further notice, as follows:—

Cavalry horses, 5 to 10 years old, 15 to 16 hands high.

Artillery horses, 6 to 10 years old, 15½ hands high, and over 1,100 pounds, and dark color.

Price for cavalry horses, $165. Price for artillery horses, $180. Payable in such funds as may be furnished by the Government.

4 3 GEO. T. BROWNING, Capt. and A. Q. M.

SOLID EMERY WHEELS, SILICATE OR VULCANITE, of every size, promptly made or shipped from stock. N. Y. EMERY WHEEL CO., 94 Beekman street, New York. 4 2*

MILL STONE DRESSING DIAMONDS SET IN Patent Protector and Guide.—For sale by JOHN DICKINSON, Patentee and Sole Manufacturer and Importer of Diamonds for all Mechanical purposes. Also, Manufacturer of Glazier's Diamonds, No. 64 Nassau street, New York City. Old Diamonds reset. N. B.—Send postage stamp for Descriptive Circular of the Dresser. 4 12*

CLOTHING BUREAU, QUARTERMASTER GENERAL'S OFFICE, WASHINGTON, January 9, 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 25th inst., for furnishing by contract at the depot of Army Clothing and Equipage, New York City,

Uniform Coats, Infantry, standard.
Artillery Jackets, do.
Trousers, Infantry, do.
Sack Coats, lined, do.
Sack Coats, unlined, do.
Shirts, Domestic Flannel, do.
Drawers, Canton Flannel, do.
Stockings, do.
Bootees, sewed and pegged, do.
Boots, Cavalry, sewed and pegged, do.
Blankets, India rubber, do.
Ponchos, India-rubber, do.
Knapsacks, do.
Haversacks, do.
Canteens, do.
Camp Kettles, do.
Mess Pans, do.
Axes, Felling, do.
Pick Axes, do.
Hatchets, do.
Spades, do.
Shovels, do.
Garrison Flags, do.
Tents, Hospital, do.
Tents, Shelter, 8-oz. cotton duck, do.
Great Coat Straps, do.

Further information may be had, and samples of the above articles may be seen, at the office of Army Clothing and Equipage, New York.

Bidders may state the number they propose to furnish, how soon they can commence, and the number they can deliver weekly, and will submit samples of the articles, or of the material of which they are to be made, and, when a textile fabric, at least one yard should be furnished.

Proposals must be accompanied by a guaranty, signed by at least two responsible persons, setting forth that if a contract is awarded to the party making the bid, that he or they will at once execute the contract, and give bonds for the proper fulfillment of the same.

The right is reserved to the United States to reject any part or the whole of the bids, as may be deemed for the interest of the service.

Awards will be subject to the approval of the Quartermaster-General of the Army.

Supplies must be delivered in regulation packing boxes.

Proposals should be indorsed, "Proposals for furnishing (here insert the name of the article bid for) and addressed to

Bt. Brig.-Gen. D. H. VINTON,
4 2 D. Q. M. General, New York City

CLOTHING BUREAU, Q. M. GENERAL'S OFFICE, WASHINGTON, January 6, 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 TUESDAY, the 17th inst., for furnishing by contract at the Depot of Army Clothing and Equipage, New York City, Great Coats, foot, like standard sample; Great Coats, mounted, like standard sample.

Bidders will state the number they wish to furnish, how soon they can commence, and the number they can deliver monthly, and will submit a sample of the kersey of which they propose to make the coats.

Proposals must be accompanied by a proper guaranty, signed by at least two responsible parties, setting forth that if a contract is awarded to the party making the bid that he or they will at once execute the contract and give bonds for the proper fulfillment of the same.

The right is reserved by the United States to reject any part or the whole of the bids, as may be deemed for the interest of the service.

Awards will be subject to the approval of the Quartermaster General.

The supplies must be delivered in regulation packing boxes.

Proposals should be indorsed "Proposals for Great Coats," and addressed to

Bt. Brig.-Gen. D. H. VINTON,
1 D. Q. M. Gen. U. S. A.

OFFICE OF INVENTOR'S ASSOCIATION, No. 61 BLEECKER STREET (East of Broadway), N. Y. City.

STACKPOLE, WENDELL & COBB, INVENTORS, Manufacturers and Wholesale Dealers in Patents. Patents Introduced and Sold on Commission. 4 2*

STUMP'S IMPROVED PATENT BEE-HIVE.—THE subscriber having obtained a patent for an improved Bee-hive, which surpasses any Bee-hive ever offered for sale, will dispose of the right on the following terms:—

Two counties for $50; ten counties, $100; twenty-five counties, $250. A model and specifications will be furnished to each purchaser at the above rates. For further particulars address HENRY STUMP, Adel, Dallas County, Iowa. 1*

FOR SALE.—ONE 10-HORSE AND ONE 5-HORSE Power Steam Engine. Address P. HOFFHEINS, Dover, Pa. 4 2*

STEAM ENGINES, MACHINERY, ETC.—STEAM ENGINES from 10 to 150-horse power, with link motion, variable cut-off, of the most approved construction; also lathes, mill-gearing, shafting, hangers, e.c., and Machinery in general. Address

4 1y M. & T. SAULT, New Haven, Conn.

THE BEST READING of the day is found in the Monthly Magazines. Among these the ATLANTIC MONTHLY is placed at the head of all American Magazines. It enlists the best American writers, is thoroughly national in tone, and treats topics of living interest. Its price is low, being only $4 a year, 35 cents a number. Clubs furnished at lower rates. The Magazine will be better than ever for the year 1865. Subscriptions should begin with the January number, which contains articles by Longfellow, Bryant, Whittier, Lowell, Holmes, Hawthorne, Mrs. Stowe, Bayard Taylor, and others. The January number sent as a specimen for 25 cents.

Address TICKNOR & FIELDS, Boston.

SCOTCH GLASS TUBES, STEAM AND WATER GAGES FOR SALE. E BROWN, No. 311 Walnut street, Phila. 3 2*

CHIEF QUARTERMASTER'S OFFICE, Philadelphia, January 12th, 1865.

Sealed Proposals will be received at this office until 12 o'clock M., on Thursday, the 19th instant, for supplying the Schuylkill Arsenal with the following articles, viz:—

6-4 Dark Blue Cloth, Army Standard.
6-4 Dark Blue Kersey, Army Standard.
Vest Buttons, Army Standard.
⅝-inch Yellow Worsted Lace, Army Standard.
Brass Crossed Sabers, for Hats, Army Standard.
Brass Eagles, for Hats, Army Standard.
Regimental Colors, (Infantry), Army Standard.
Regimental Descriptive Books, Army Standard.
Regimental Index Books, Army Standard.
Hospital Tent Poles, (sets), Army Standard.
Heavy 54 inch Burlaps, Sample Required.
Canvas Padding, Sample Required.
Canteen Webbing, 1 inch, (Linen or Cotton), Sample Required.
Machine Thread, (Stewarts' Linen, No. 70, spools), Sample required.
White Basting Cotton, Sample Required.
Flax Sewing Twine, Sample Required.

Each bid must be guaranteed by two responsible persons whose signatures must be appended to the guarantee, and certified to, as being good and sufficient security for the amount involved, by some public functionary of the United States.

Bids from defaulting contractors, and those that do not fully comply with the requirements of this advertisement will not be considered.

Blank forms for proposals embracing the terms of the guarantee required on each bid, can be had on application at this office, and none others which do not embrace this guarantee will be considered, nor will any proposal be considered which does not strictly conform to the requirements therein stated.

Bidders will state the quantity they propose to furnish, how soon they can commence, and the quantity they can deliver weekly.

The right is reserved by the United States to reject any part or the whole of the bids, as may be deemed best for the interest of the service.

Samples of such articles as are required to be of army standard, can be seen at this office.

Proposals must be endorsed "Proposals for Army Supplies," stating on the envelope the particular article bid for

HERMAN BIGGS,
Colonel Quartermaster's Department.

CLOTHING BUREAU, QUARTERMASTER GENERAL'S OFFICE, WASHINGTON, January 12, 1865.

ARMY SUPPLIES.—SEALED PROPOSALS WILL be received at the Office of Army Clothing and Equipage, Philadelphia, until 12 o'clock, M., on WEDNESDAY the 17th inst., for furnishing, by contract, at the Depot of Army Clothing and Equipage, Philadelphia, viz:—

Sack Coats, lined, army standard.
Sack Coats, unlined, do.
Blankets, India-rubber, for infantry, do.
Knapsacks, complete, do.
Hatchets, do.
Uniform Hats, do
Hat Cords and Tassels, do.
Camp Kettles, do.
Mess Pans, do.
Shelter Tents, do.

Each bid must be guaranteed by two responsible persons whose signatures must be appended to the guarantees, and certified to as being good and sufficient security for the amount involved, by some public functionary of the United States.

Bids from defaulting contractors, and those that do not fully comply with the requirements of this advertisement, will not be considered.

Blank forms for proposals, embracing the terms of the guaranty required in each bid, can be had on application at this office, and none others which do not embrace this guaranty will be considered, nor will any proposal be considered which does not strictly conform to the requirements therein stated.

Bidders will state the quantity they propose to furnish, how soon they can commence, and the quantity they can deliver weekly.

The right is reserved to the United States to reject any part or the whole of the bids, as may be deemed best for the interest of the service.

Awards will be subject to the approval of the Quartermaster-General of the army.

Samples can be seen at this office, and proposals must be indorsed "Proposals for Army Supplies," stating on the envelope the particular article bid for. HERMAN BIGGS,
4 2 Colonel Quartermaster's Department.

FITT'S CELEBRATED STEAM GONG CAN BE heard thirty miles. The best kind of an alarm. Its cost $100 including valve.

STEAM BOILER FEEDER CO., Worcester, Mass., are the only manufacturers. 4 5*

VALUABLE RIGHTS FOR SALE FOR MOST OF the States, or for any City or County, of HUNT'S PATENT FOOT-WARMER, the only small, practical and reliable article out for warm feet while traveling or sitting in cold rooms or churches. Price, $5. Sent by Express, payable on delivery. See engraving and description in SCIENTIFIC AMERICAN of Jan. 14. SOL. HUNT & CO., Post-office Box 90, or No. 30 West Fifth street, Cincinnati. 1

TO STEAM PLOW BUILDERS.—I HAVE A NEW idea for a Motive Power for Steam Plows. Experiments so far very satisfactory. I wish to find a party willing to become interested in it. Address LIGHT DRAUGHT, Philadelphia P. O., Pa. 4 2*

BRIG.-GEN. H. HAUPT WRITES TO W. H. PAINE in relation to his Surveyor's Measure: "Have no hesitation in expressing the opinion that it is superior as an instrument for measuring, for the use of Engineers and Surveyors, to any yet invented. Its accuracy is surprising; its durability great; its adjustments perfect; its weight trifling." For sale by E. & G. W. BLUNT, No. 179 Water street, N. Y., JOHN R. EVANS, No. 309 Penn. av., Washington, D. C. F. LAWRENCE, Sheboygan, Wis. 1*

$5 TO $15 PER DAY, CLEAR PROFIT, BY USING TOTTEN'S PATENT FRENCH FLUTING APPARATUS. State Rights for sale. Address R. SMITH,
1* No. 158 Maiden Lane, N. Y.

SPOKE LATHES (BLANCHARD'S) OF AN IMpraved pattern, made by J. GLEASON, No. 1,030 Germantown avenue, Philadelphia, Pa. 4 5*

GENL. SHERIDAN.—PORTRAIT, CHARACTER and Biography, in Jan. Double No. Phrenological. Ask your Newsman for it, or send to Messrs. FOWLER & WELLS. 3 2*

PLATINA PLATE AND WIRE IMPORTED BY SAMUEL S. WHITE, 658 Broadway New York. 2 4*

PLATINA SCRAPS BOUGHT BY SAMUEL S. WHITE, 658 Broadway, New York. 2 2*

FOR PATENT STAVE AND BARREL MACHINERY, Shingle Machines, Etc., address J. A. FAY & CO.,
4btf Cincinnati, Ohio.

AMES'S IRON WORKS, OSWEGO, N. Y.—WE ARE now manufacturing a superior article of eight and twelve horse-power Portable Engines. Also Fays's Patent Forge Hammer, the best forge hammer now in use for all forgings under six inches.
3 2* H. M. AMES & CO.

MELODEON OR CABINET ORGAN TUNERS WANTED.—MASON & HAMLIN will give immediate employment to a number of experienced and skillful Tuners, at their Cabinet Organ Manufactory, corner of Cambridge and Charles streets, Boston. None but those who are masters of their art need apply, but to such great inducements will be offered. Apply personally or by letter. 3 5

ROOMS, WITH STEAM POWER, TO LET, AT NO. 115 East Twenty-ninth street. 3 2

PLATINA FOR CHEMISTS.—TELEGRAPH AND Galvanic Batteries, Etc JOHNSON & LUND, Importers, No. 27 North Seventh street, Philadelphia.

BLINN'S TIN, SHEET-IRON AND COPPER-PLATE WORKERS.—A New and Revised Edition, gotten up in a Superior Style.

A PRACTICAL WORKSHOP COMPANION FOR TIN, SHEET-IRON AND COPPER-PLATE WORKERS: Containing

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A Pattern for, or an Envelope for a Frustrum of a Cone.
A Tapering Oval Article to be in four Sections.
A Tapering Oval Article to be in two Sections.
A Tapering Oval Article.
A Tapering Oval or Oblong Article, the sides to be Straight, one end to be a Semicircle, the other end to be Straight, with Quarter Circle corners, to be in two Sections.
A Tapering Oval or Oblong Article, the sides to be Straight, with Semicircle ends, to be in two Sections.
Covering of Circular Roofs.
To cover a Dome by the first Method.
To cover a Dome by the second Method.
To ascertain the Outline of a Course of covering to a Dome, without reference to a Section of the Dome.
To describe a Pattern for a Tapering Square Article.
A Square Tapering Article to be in two Sections.
A Tapering Article, the Base to be Square, and the Top a Circle, in two Sections.
A Tapering Article, the Base to be a Rectangle, and the Top Square, in two Sections.
A Tapering Article, the Base to be a Rectangle, and the Top a Circle, in two Sections.
A Tapering Article, the Top and Base to be a Rectangle, in two Sections.
Tapering Octagon Top or Cover.
A Miter Joint at Right Angles for a Semicircle Gutter.
A Miter Joint at any Angle for a Semicircle Gutter.
A Miter Joint for an O G Gutter at Right Angles.
A Miter Joint for an O G Cornice at Right Angles; also an Offset.
An Octagon O G Lamp Top or Cover.
A T Pipe at Right Angles.
A T Pipe at any Angle.
A T Pipe, the Collar to be smaller than the Main Pipe.
A T Pipe at any Angle, the Collar to be set on one side of the Main Pipe.
A Pipe to fit a flat Surface at any Angle, as the Side of a Roof of a Building.
A Pipe to fit two flat Surfaces, as the Roof of a Building.
An Elbow at Right Angles.
An Elbow Pattern at any Angle.
An Elbow in three Sections.
An Elbow in four Sections.
An Elbow in five Sections.
A Tapering Elbow.
An Oval Boiler Cover.
A Flange for a Pipe that goes on the Roof of a Building.
Octagon or Square top or Cover.
Steamer Cover.
An Ellipse or Oval, having two Diameters given.
An Ellipse with the Rule and Compasses, the Transverse and Conjugate Diameters being given, that is the Length and Width.
To find the Center and two Arcs of an Ellipse.
To find the Radius and Versed Sine for a given Frustrum of a Cone.
Practical Geometry.
Decimal Equivalents to Fractional Parts of Lineal Measurement.
Definitions of Arithmetical Signs.
Mensuration of Surfaces.
Mensuration of Solids and Capacities of Bodies.
Tables of Weights of Iron, Copper and Lead.
Tables of the Circumferences and Areas of Circles.
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Weight of Water.
Effects produced by Water in an Aeriform State.
Practical Properties of Water.
Effects produced by Water in its Natural State.
Effects of Heat at certain Temperatures.
Tempering.
Effects produced by Air in its Natural and in a Rarefied State.
Table of the Expansion of Atmospheric Air by Heat.
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PROPOSALS FOR ICE.

MEDICAL PURVEYOR'S OFFICE, WASHINGTON, D. C.

Sealed Proposals will be received at this Office until January 25, 1865, for furnishing ICE to the Medical Department of the Army, at the points herein designated. The Ice to be stored by the contractor in properly-constructed ice houses at each point of delivery, on or before the 15th of April next; the ice not to be receipted for until its quality, the fitness of the ice-house, and the manner in which it is packed shall have been approved by a medical officer, and payment will be made only for the amount thus actually stored and receipted for.

The proposals will be made for the quantities indicated below as required at the respective places, with the proviso that should more be needed at any time for the year's supply, it shall be furnished at the same rates and under the same conditions.

QUANTITY TO BE DELIVERED AT

Annapolis, Md., ice-house, owned by the United States.....150 tuns.
Point Lookout, Md.. ice-house owned by the United States.200 tuns.
Fortress Monroe, Va., ice-house owned by the United States 280 tuns.
Portsmouth, Va., ice-house not owned by the United States 100 tuns.
Newbern, N. C., ice-house not owned by the United States..400 tuns.
Hilton Head, S. C., ice-house owned by the United States...450 tuns.
Beaufort, S. C., ice-house owned by the United States.....300 tuns.
Savannah, Ga., ice-house not owned by the United States..400 tuns.
Pensacola, Fla., ice-house not owned by the United States..100 tuns.
Mobile Bay, Ala., ice-house not owned by the United States.100 tuns.
New Orleans, La., ice-house owned by the United States....500 tuns.

Proposals will also be received for furnishing Ice, daily by weight, for the year 1865—in such quantities as may be required by the Surgeons in charge—at United States General Hospitals, at the places enumerated above, and upon the following annual estimate, in and near:—

Boston, Mass..... 10 tuns.
Portsmouth Grove, R. I..... 130 tuns.
New Haven, Conn..... 60 tuns.
New York..... 800 tuns.
Newark, N. J..... 100 tuns.
Philadelphia, Pa.....1,300 tuns.
Baltimore, Md..... 500 tuns.
Frederick, Md..... 75 tuns.
Washington, D. C.....2,500 tuns.

All additional amounts that may be required at these places until January 1, 1865, are to be furnished at the same rates.

FORM OF PROPOSAL.

The undersigned proposes to furnish —— tuns of first quality Ice, carefully packed in substantial ice-houses, at the within-named points, namely: ——, ——, ——, ——, at the following price per tun or two thousand pounds, namely: at ——, ——, ——, —— tuns, at $—— per tun.

The Ice to be subject to the inspection, measurement and approval of a Medical Officer, or other properly-appointed inspector, before being receipted for.

Payment to be made from time to time upon duplicate bills certified to by the Medical Director.

(Signed) ——.
——.

FORM OF PROPOSAL.

The undersigned proposes to furnish daily, or otherwise, all the Ice required for the hospitals, upon approved requisitions of Surgeons in charge, at or near the within-named points, at the following price per hundred pounds, namely: —— —— —— —— $—— cents per hundred pounds.

The Ice shall be of the best quality, and subject to the approval of the Surgeon in charge, who shall receipt for the actual amount delivered at each hospital.

Payment to be made from time to time upon duplicate bills, certified to by the Medical Director.

(Signed) ——.
——.

The above form of proposals will be adhered to as closely as practicable. Other forms will be received by the Department and duly considered.

A proper guarantee that the bidder is able to fulfil the contract, certified to by the Clerk of the nearest District Court, or a United States District Attorney, must accompany the proposal, or it will be rejected.

An oath of allegiance to the United States Government must also accompany the proposal.

The contracts will be awarded to the lowest responsible party or parties, who will be duly notified by mail or otherwise that their bid is accepted, and immediately required to enter into contract under bonds to the amount of $5,000. The bonds must be properly certified, and the post-office address of principals and sureties stated upon them.

Bidders may be present in person when the proposals are opened.

The post-office address of the parties proposing must be distinctly written upon the proposal.

Proposals must be addressed to "Surgeon Charles Sutherland, U. S. Army, Medical Purveyor, Washington, D. C."

The Department reserves the right to reject any and all bids deemed unsuitable.

CHARLES SUTHERLAND,
Surgeon U. S. A. and Medical Purveyor,
Washington, D. C.

Printed forms of proposal may be had at this office. 3 3

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The merits of the invention have been fully proven.

With it the preparation of the soil for seed is expedited, cheapened and improved.

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It is peculiarly well adapted to the application of steam power.

Sample machines can be had of J. C. BIDWELL Esq., Pittsburgh, Pa.

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This derrick is intended to facilitate stacking hay, and is so arranged as to raise the hay vertically, with ease deliver and discharge it without scattering the hay over the field. The hight of the derrick is about thirty feet, and the head can be swung around very easily and readily, so as to construct a stack of any desired hight. There is a small stop, A, at the bottom which fits in two holes diametrically opposite each other; by withdrawing the stop by the rope, B, of the derrick can be swung round and retained in place by throwing the stop in again. This gives complete control over the position of the derrick, and allows the hay to be delivered at any point with great facility. As the stack is built up the derrick can be shifted to various points in a short time. The ease with which this derrick can be worked is very great, and the inventor states that after many experiments he is satisfied that this one leaves nothing to be desired.



TURNER'S HAY-STACKING DERRICK.

This invention was patented by Seth Turner, of Onarga, Iroquois Co., Ill., through the Scientific American Patent Agency, on Dec, 13, 1864. For further information address the inventor, as above.

A Hint on Carpets.

Of all the expensive things in a modern house of the ordinary class perhaps carpets are the dearest. In case of removal, they become almost useless, and have to be sacrificed at any price that can be got for them, because, having been cut and measured for one room, perhaps of a peculiar shape, they are useless in any other ; for if the pattern could be matched, which it often cannot, a bit of bran new carpet sewn on a bit not so new, would be out of harmony, and tell a story which pride of poverty would rather were concealed. The Persian and Turkish system of carpeting rooms is infinitely better and prettier than ours. The Persian carpets, especially those from Resht, are exquisitely beautiful. Their colors are brighter, the designs are prettier, and they are far more durable than the European carpets. They are made in strips usually between two and three yards long, and about one yard in breadth, to go round the sides of a room, with a square carpet of any size preferred, for the center.

They do not require to be nailed or fitted, and a sufficient number of them, will, of course, carpet any room, however large or small. They have a very rich and grand appearance too. In summer they are easily taken up, beaten, rolled and put aside by a single man-servant; and in the hot weather why should we not more generally imitate Continental custom, by painting or polishing our floors? Floors painted or polished look far prettier in July sunshine than any carpets, which are then mere fusty traps to catch dust, harbor insects and retain bad smells. Everything has its use and its season. The use and season of carpets are not in the summer time. Where it is impossible to paint or polish the floors of a house, the employment of oil-cloth will be found good economy in summer, and far cleaner. Oil-cloth, too, of charming patterns, may now be bought very cheap, and it keeps a room delightfully cool and fresh.—*All the Year Round.*

BEECHER'S VENEER FRUIT BASKET.

The necessity for having some reliable contrivance to protect small fruits, while being transported to market, can readily be seen by referring to the many and varied baskets, pots and boxes, which from time to time are used for that purpose.

The old fashioned splint basket first used, (and still used in some sections,) is so constructed that it can not stand up without help, and is therefore continually spilling the fruit.

Then come the square boxes, a multiplicity of kinds, but all afflicted with at least one difficulty. They will not pack close enough together, when empty, to transport, except at ruinous cost to the shippers.



A great improvement on the above named kinds, in so far as they pack closely together, are the several pot-shaped styles of basket that have been used so extensively for the past few years. But these styles, escaping one evil, encounter another nearly as formidable. They are so small at the bottom as necessarily to be very deep to hold the requisite measure; the effect of which is that, when filled, the lower tier of berries are more or less damaged by the weight of those above them.

To obviate the difficulties here mentioned, and at the same time to combine all the excellencies of the different styles heretofore used, the Veneer Fruit Basket, which is represented by the above engraving, has been invented.

These baskets when empty nest closely together, and can therefore be shipped to any distance at a very light cost for freight. Again ; the bottom being so large, allows the sides to be correspondingly low, thus furnishing what is an absolute necessity for the preservation and transportation of all ripe fruits—a shallow and well ventilated Basket.

They are furnished at the following prices : Quart size, $35,00 per thousand Baskets. Pint size, $30,00 per thousand Baskets.

This article was patented through Scientific American Patent agency, May, 31, 1864.

For further information address A. Beecher & Sons, Westville, Conn.

At Providence, last year, the transactions in printing cloths amounted to 2,697,150 pieces, a falling off from the previous year of 1,225,650 pieces. To show the extraordinary rise in prices, it is stated that printing cloths that sold for 4¾ cents per yard January 1, 1861, sold for 9 cents at the beginning of 1862, 14¾ cents 1863, 16¾ cents 1864, and 27 cents January 1, 1865.

TO

INVENTORS, MECHANICS, AGRICULTURALISTS.

THE ANNUAL

PROSPECTUS

OF THE

Scientific American.

THE CHEAPEST AND BEST

MECHANICAL JOURNAL IN THE WORLD,

A NEW VOLUME OF WHICH COMMENCES

JANUARY 1, 1865.

This valuable journal has been published nineteen years, and during all that time it has been the firm and steady advocate of the interests of the Inventor, Mechanic, Manufacturer and Farmer, and the faithful chronicler of the

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The Scientific American is the largest, the only reliable, and most widely-circulated journal of the kind now published in the United States. It has witnessed the beginning and growth of nearly all the great inventions and discoveries of the day, most of which have been illustrated and described in its columns. It also contains a Weekly Official List of all the Patent Claims, a feature of great value to all Inventors and Patentees. In the

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this latter department being very full and of great value to Farmers and Gardeners; articles embracing every department of Popular Science, which everybody can understand.

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will, as heretofore, form a prominent feature. Owing to the very large experience of the publishers, Messrs. Munn & Co., as Solicitors of Patents, this department of the paper will possess great interest to Patentees and Inventors.

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Scientific American.

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

Vol. XII.—No. 5. (NEW SERIES.)

NEW YORK, JANUARY 28, 1865.

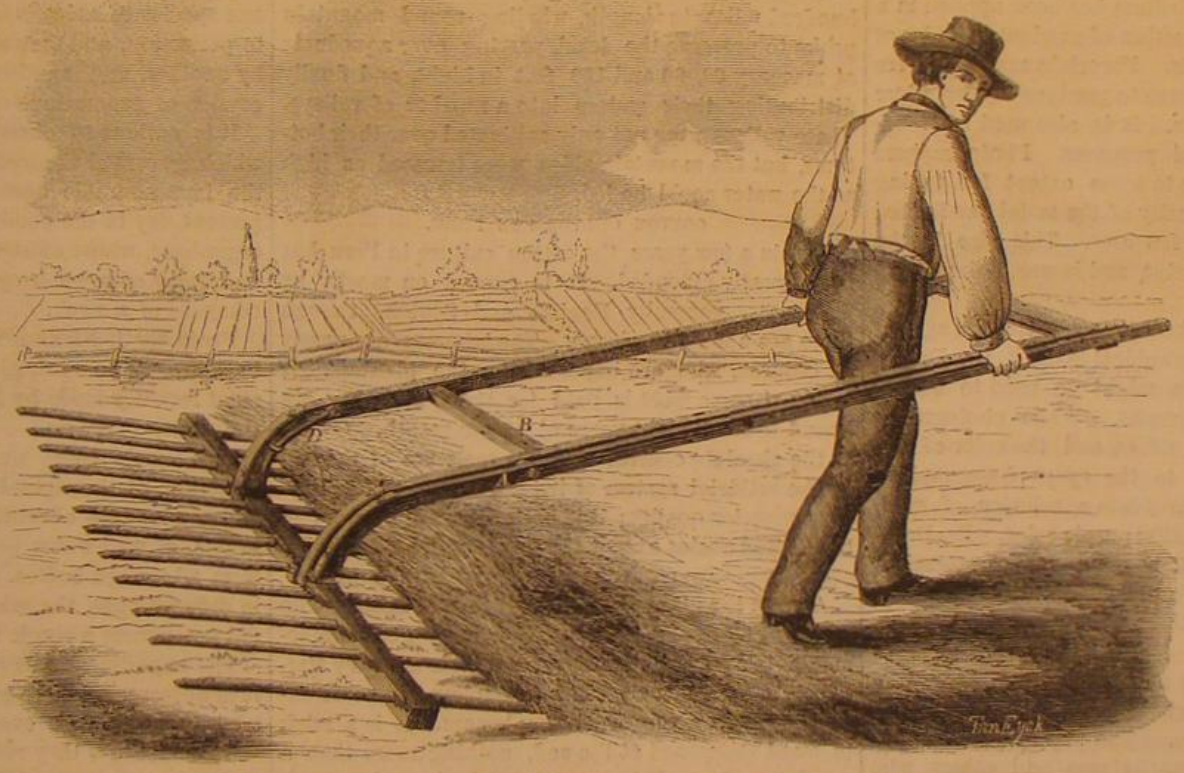
$3 PER ANNUM (IN ADVANCE.)

Mechanical Hand Rake.

The uses and importance of the horse hay-rake are so well known that we need not comment upon them. It would be difficult to find another tool which is so important or pays for itself so quickly. The rake here illustrated is similar in its construction to the horse rake, but is much lighter and narrower, being adapted to the strength of an ordinary man. It is intended to be used where horses cannot be, as on lawns, or when the team is required on other work.

The principal novelty is in the mechanism for holding the rake in position and for detaching it when the load is to be thrown off. The details consist in a lever, A, joined to the frame, B, of the rake. The end of the lever is provided with a metallic guard which buts against a projection, C, screwed to the rake head. This device retains the rake in its position while in operation; a simple depression of the lever, A, being all that is needed to throw it out of contact with the rake head and allow the same to revolve. There are also springs, D, on the inner side of the frame which keep the rake teeth in contact with the ground.

This is a very useful and convenient utensil; for raking lawns, grounds or other places where it is undesirable to bring a horse, it will be found eligible.



RUNDLETT'S MECHANICAL HAND RAKE.

It was patented through the Scientific American Patent Agency on the 24th of Oct., 1864, by S. C. Rundlett, of Portland, Me. For further information address Rundlett & Johnson, proprietors, Portland, Me. E. Chapman, Jr., 229 Congress street, Portland, Me., is the agent for the same.

TOOL FOR DRAWING BROKEN PUMP RODS.



We publish herewith an illustration of a very convenient little tool for drawing broken pump rods or drills for oil wells, which have slipped down out of reach. It is simply an iron ring, *a*, with a bail, *b*, on it, having a thread tapped in the square top, *c* There are two pawls, *d*, in the ring, jointed so that they move easily, and of such length that they will be about one-fourth of an inch less in diameter than the size of the broken rod. When this apparatus is let down the pawls slip over the rod, and when the whole apparatus is lifted by a rope or wire, the pawls bite on the broken drill or other object, and hold it firmly so that there is no escape. This tool is cheaply made and will be found serviceable.

Intensity of Action of Different Parts of the Solar Disk.

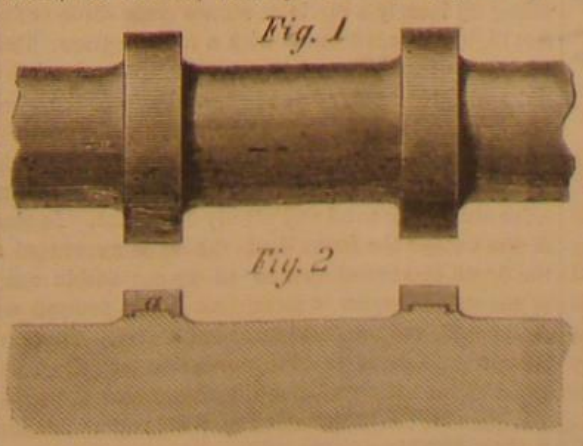
With regard to the late researches by Secchi—according to which the calorific radiation of the center of the solar disk is greater than that of the borders, nearly in the ration of 2 : 1, Mr. Volpicelli writes that the fact was very exactly observed in 1614 by Luc Valerio, a mathematician of Naples, author of a work, *De centro gravitatis solidorum*, and of another *De quadratura parabolæ per simplex falsum*. He was a professor in the Roman University, and has been called the Archimedes of his age

In one of his letters to Galileo, Luc Valerio considers the rays proceding from the central part of the solar disk as the more active.

Analogous facts have been observed by Mr. Roscoe, according to whom the center of the disk exerts a more intense chemical action than the borders. He has also observed that the south polar zone is more active than the north.—*Silliman's Journal.*

HOW TO SHRINK COLLARS ON A SHAFT.

In forging heavy shafts for marine engines or other work, the collars, where journals come, give a great



deal of trouble. A very neat way of putting them on by shrinking is shown in the accompanying engravings, in which Fig. 1 is a front elevation, and Fig. 2 a profile in section. The shaft is left slightly large where the journals occur, and bosses turned for the collars to set on. On these the seats for the collars are turned. The collars are welded up separately, and bored and turned complete in the lathe, a recess being left for the rib on the shaft. This rib need not be more than three-sixteenths of an inch high in shafts twenty inches in diameter, being limited in size by the amount the collar will expand when heated. The lateral shrinkage left on the collar should not be more than the one-hundredth of an inch; a snug fit will answer, since the collar never can shift even if it becomes loose.

After the several parts of the shaft are finished the collars are heated and shipped over the end of it, but care must be taken to ascertain first, whether the collar has been expanded sufficiently, otherwise it will stick when half on. It must not be heated so hot as to raise scale, for that would destroy the fit of the several parts. For heavy shafts this will be found an expeditious method.

Defaced Treasury Notes.

The *United States Mail*, the official paper of the Post Office Department, says:—"Postmasters are obliged to receive all Treasury notes for stamps and postages, if clearly genuine, no matter how torn or defaced they may be, provided one-twentieth part thereof be not missing. Such notes and currency received as are unfit for re-issue should be kept separate and distinct, and returned as occasion requires to the Treasurer of the United States, Washington, in sums of not less than three dollars, to be exchanged for new."

Cement for Rooms.

An invention by M. Sorel, of Paris, is stated to be superior to plaster of Paris for coating the walls of rooms. It is used in the following manner:—A coat of oxide of zinc mixed with size made up like a wash, is first laid on the wall, ceiling, or wainscot, and over that a coat of chloride of zinc applied, being prepared in the same way as the first wash. The oxide and chloride effect an immediate combination, and form a kind of cement, smooth and polished as glass, and possessing the advantages of oil paint, without its disadvantages of smell.—*Dublin Med. Press*, Aug. 31, 1864.

How to Make Green Confectionery.

The *Druggists' Circular* informs a correspondent that a harmless green color for dyeing confectionery can be made by digesting five grains of genuine saffron in two drachms of distilled water for twenty-four hours; meanwhile, dissolve four grains of sulphate of indigo in half an ounce of distilled water, and mix the two solutions; the liquid will assume a beautiful green color. Three drachms of this are sufficient for dyeing intensely two pounds and a half of sugar. The green liquid, boiled with sugar and concentrated to the consistency of sirup, may be preserved for a long time.

POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

The Association held its regular weekly meeting at its room at the Cooper Institute, on Thursday evening Jan. 12, 1865, the President, S. D. Tillman, Esq. in the chair.

THE METAL PALLADIUM.

Dr. Parmelee exhibited a coil of palladium wire weighing about four ounces, Troy, and valued at about $600. He states the sample was manufactured by Messieurs Desmoutes, Morin, & Chapuis, of Paris, and that the specimen is more interesting from the fact of its being chemically pure, while others are generally alloyed with from 40 to 60 per cent of silver. Its general characters are like those of platinum; but, while it is infusible in an ordinary wind furnace, it melts at a lower temperature than that metal. Its specific gravity is 11.5; atomic weight 53.24. It occurs chiefly in the ore of platinum, in the proportion of about one per cent; it is extracted by dissolving this ore in aqua regia, and precipitating the palladium from the solution by chloride of ammonium. After filtration the palladium is separated by cyanide of mercury, or cyanide of palladium. This is usually converted into a sulphide by heating it with sulphur; and afterward the sulphur is expelled by repeated washings. There are other processes of a more complicated character and probably less valuable. Palladium has been applied in a few cases to the construction of graduated scales of astronomical instruments. Porcelain manufacturers employ it in some instances to produce a fine silver gilt on ornamental wares. It is also used in bronzing brass for ornamental purposes. Photographers also employ the chloride to some extent for toning their pictures. The scarcity of the metal has limited the application of it to few uses. This wire is the $\frac{1}{38}$th of an inch in diameter, and is worth about $40 per foot.

Professor Seely remarked that a few years ago, at a meeting of the Photographical Society, Dr. Draper suggested that palladium might be used to advantage for toning photographs. When photographs are made the darks are silver, and the color of this metal is not pleasing to the eye; photographers therefore dip their pictures into a solution of gold, which gives them a beautiful purple color. Dr. Draper's suggestion attracted a good deal of attention, and palladium was probably inquired for at every place in the city where there was any reason for supposing that it might be found. There was none to be had, and the speaker applied to Dr. Draper, who said that a few years before there was plenty in the market at $10 per ounce. The supply had been exhausted by makers of gas fixtures and others, who used the metal for giving a beautiful bronze finish to their work.

Professor Everett stated that a few years since he obtained about four ounces of palladium from some platinum ore that he was analyzing, and he made it into a solution of chloride of palladium, to be used for bronzing. After selling three bottles it was discovered that the supply in the market was running short, and when we sold the first lot from the fourth bottle, my partner filled up the bottle with water. The solution seemed to work just as well till it became very weak, so that we got as much for the fourth bottle as we did for the other three.

Mr. Maddock stated that the bronzing of porcelain is now effected with a preparation of iron.

THREAD.

Dr. Rowell illustrated by a piece of tape that if a thread or other string is wound on a card with the right hand, holding the card in the left, a twist is put into the string at every revolution around the card; but if the card is shifted to the right hand and the winding continued with the left, the twists are taken out, or the thread is twisted in the opposite direction. The same action takes place in ordinary sewing by hand, a twist being either put into the thread or taken out at every stitch. It is for this reason that girls are taught to work button holes always in the same direction, going from left to right along the lower edge, and from right to left above when "twist" is used. The twisting is avoided in winding thread by adopting the method usually practiced by boys in winding their kite strings. To avoid kinking or spoiling the thread from the twisting in sewing, thread is cabled as it is called; that is, it is first spun into threads and then these are twisted together. In sewing on sewing machines, no twisting of the thread takes place, it is therefore not necessary to cable the cotton for this use.

SOME FACTS ABOUT PERU.

At the meeting of the Farmers' Club, on Tuesday afternoon, January 17, Mr. P. G. Squier gave an account of the ancient and modern agriculture of Peru. We select from his discourse a few of the most interesting items.

THE INCAS.

At the time of the discovery of America by Europeans, Peru was governed by the Incas, who were both priests and rulers, and they had established the most absolute despotism. The organization of society was a kind of socialism, without either poverty or wealth. On the birth of a male child a certain portion of land was assigned him, and this was increased when he reached the age of ten years, and still farther when he was married, amounting then, however, to little more than an acre. Only a small proportion of the country is arable land, and that can be cultivated only by means of artificial irrigation, as there is no rain. Under the Incas every foot of land susceptible of tillage was cultivated to the very highest degree. Canals were constructed two hundred miles in length, winding round mountain peaks to preserve the level, passing over aqueducts of masonry 60, 80 and 100 feet in hight, and finally distributing their waters into a number of valleys. These valleys were not only cultivated over their bottoms, but the mountain sides were terraced as high as the water could be led.

COTTON CULTURE IN PERU.

Within a few years the cotton culture in Peru has been greatly extended. It is carried on mostly by foreigners, generally English and Scotch, though there are a few Americans. The laborers are nearly all Chinese, who are imported by the planters. A bonus of some $400 is paid for them, and they are bound to work eight years at $8 per month. Owing to the absolute control over the moisture of the soil by the artificial system of irrigation, the cotton is of very superior quality; it is better than any raised in the United States except the Sea Island.

AGRICULTURAL IMPLEMENTS.

Among the planters, the English and Scotch who employ Chinese laborers use generally good implements, but among the natives the tools are very simple. On the coast the plow is employed to some extent, but it is a very rude implement. It is a stick of wood sharpened at the end, nothing more than a wooden wedge. It is drawn by a single ox, by means of traces attached to his horns, and he is guided by means of a cord which is passed through his nose. The plow is the same that is generally used in Europe. I have seen one just like it within ten miles of Paris. Even this plow is used in Peru only on the coast; the one implement with which the agriculture of Peru is almost wholly conducted is an iron adze, with a short handle, to be wielded with one hand.

CONDITION OF THE PEOPLE.

The mass of the people live in the most miserable and squalid condition. Their dwellings are made by piling up loosely a circle of stones some three or four feet high, and covering it with a roof of grass. Their cooking utensils consist generally of one earthen pot and three or four dried bones. Perhaps the whole furniture of the house might be worth three cents.

RIVERS LOST AND FOUND.

Some of the rivers that flow down from the mountains sink in the sand and utterly disappear. In some of the valleys the Incas had the sand excavated to the depth of several feet, so as to get within reach of the subterranean waters, and when ground was found sufficiently moist it was cultivated. The sand thrown out formed great ridges across the valley. The moist strips between these ridges are now the choice localities for the cultivation of the grape. Looking down the valley you see nothing but a succession of dry, barren ridges of sand, but if you climb to the top of one of these you look down upon a display of verdure unsurpassed on the face of the earth.

DRUNKENNESS.

The three principal crops of Peru are Indian corn, cotton and the sugar cane. The juice of the sugar cane in the United States and Cuba seldom yields more than six per cent of sugar, but in some of the valleys of Peru it yields more than fourteen per cent. A large portion of it is made into the intoxicating drink called *aguardiente*. This rum is drunk by all classes of the people, old and young, rich and poor, male and female, religious and irreligious, and at all times of the day and night. The general condition of the people of Peru may be said to be that of drunkenness.

DIFFICULTY OF COOKING.

Mr. Squier described a large lake in the mountains 12,500 feet above the level of the sea, the waters of which are some 20° warmer than the surrounding atmosphere. The warmth of the water so tempers the climate that Indian corn may be grown on the borders of the lake, but water boils at so low a temperature at this high altitude that it is difficult to cook any kind of food properly. It is customary, therefore, to soak corn several months before the attempt is made to cook it in the lukewarm boiling water of that altitude.

THE LAW OF SUCCESSIVE SPECIES.

Of the many thousand species of plants and animals that existed in the early geologic ages, not a single one remains. The patient study of that wonderful history, which has been engraven by the hand of the Creator in the everlasting rocks, revealed that one species of animals came forth, slowly developed to perfection, and then slowly decayed, to be followed by another, and another, and another, in long succession of generations of species.

It is curious to observe that the same great law which governed the creation of animal life through the immeasurable ages of the past, applies at the present day to the coming forth of those microscopic organisms, whose existence is so brief that the growth and decay of a whole species may be watched in the compass of a week.

Professor J. Nickles, writing from Nancy, France, to Silliman's Journal, gives this account of an experment recently made by Professor Montegazza at the University of Pavia.

Two female frogs were quickly killed, by the destruction of the spinal marrow, and placed in two glass vases each of which contained 115 cubic centigrams of well-water perfectly transparent and free from all foreign bodies. One of these vases was left in diffused light, the other was placed in a box which did not permit a single ray of light to reach it.

The experiment was continued seventeen months. It is necessary, before giving the results of this long trial, to state that every time that the two vases were compared, they remained exposed to the air for an hour or more, and that the air was renewed at each observation. Germs could, then, easily fall in; and yet the results were very different in the two cases.

The following are the observed results :

1. Two identical bodies exposed to free air may present very different phenomena of putrefaction, according as they are exposed to the influence of the light, or shut off from it.

2. The chemical and biological phenomena of the two forms of putrefaction are very different, that is, we have in each case some special chemical products, and some peculiar animal and vegetable productions.

3. In darkness, there was a marked tendency to the production of vegetable organisms and very simple infusoria ; the frog that underwent putrefaction while shut off from the light produced only some Mucedines, Monads and Vibrios ; while the other afforded a very complicated fauna—Bacteriums, Vibrois, Spirellas, Monads of different species, Amœbas, Kerones, Alysum, Enchelides, Trachelius—and, finally, Infusorians still undescribed, much resembling the Zoosperms of the Tritons.

4. The abundance and superior organization of the Infusoria depend much more upon the progress of the putrefaction than upon the amount of putrescible matter. The more simple species always appear first.

5. The production of species of Bacterium takes place many times during the course of a long putrefaction.

6, When the liquid presents a new fauna, the new species are from the outset represented by a number of individuals at once ; from one day to the next, they are simultaneously produced.

7. In the course of a long putrefaction, there are some generations which endure for some days; others exist for a much longer time.

8. Rapid changes in the chemical composition of a putrescible liquid are always, or nearly always, followed by new sets of animal and vegetable microscopic life.

9. When circumstances are little favorable to heterogeny in a very long putrefaction, there may be intervals of time of greater or less length, in which the liquid presents no organism. Whoever should content himself with observing at such a moment, might say that there had been no generation; while some days before, or some days after, there had been, or there would be, a very abundant production of vegetables, or of animals, or of both at once.

Erosion of Lead by Insects.

The *Chemical News* says:—A letter to the *Times*, signed "Y," states that the erosion of lead by certain species of insects is not generally known, and may be extremely mischievous. Not long ago it attracted the attention of the French Academy of Sciences, and several communications upon it have been published in their proceedings, the *Comptes Rendus*. In 1858 Marshal Vaillant exhibited to the Academy leaden bullets brought back from the Crimea, in some of which the larvæ of insects had excavated passages three or four millimeters in diameter; but nothing of the kind had been detected in the cartridges of the Russian army in the Crimea, and the insect which damaged the French cartridges appears to have been imported in the wood of the cases in which they were packed. The insects do not eat the lead, but simply bore it out. In 1833 Audouin exhibited to the Entomological Society of Paris sheet lead from the roof of a building, deeply grooved by insects. In 1844 Desmarest mentioned erosions of sheet lead by a species of Bostriche (*B. Capucina*), and illustrated the fact by cartridges from the arsenal at Turin. Mr. Westwood, the well-known British entomologist, has recorded observations on the perforation of lead by insects. M. Bouteille, curator of the Museum of Natural History at Grenoble, sent to the French Academy of Sciences from the collection under his charge specimens of cartridges gnawed by insects, which were found *in situ*, and the reports on the subject by Marshal Vaillant, de Quartrefages, and Milne Edwards, state the insect to be *Sirex gigas*, a large hymenopterous species, which, in the larva state, lives in the interior of old trees or pieces of wood, and which, after the completion of its metamorphosis, quits its retreat for the purpose of reproduction. Scheurer-Kestner, in 1861, communicated to the French Academy a notice of the erosion by an insect of the sheet lead of a new sulphuric acid chamber. The creature was caught in the act of escaping through the lead, having been imprisoned between it and a wooden support. But perhaps the most interesting and important case of insect erosion is that of stereotype metal, which was communicated in 1843 by M. du Boys to the Agricultural Society of Limoges.

Acclimation of Salmon in Australia.

Professor J. Nickles writes to *Silliman's Journal*:—Recent experiments carried forward by the Acclimation Society have shown that it is possible to transport to distant countries the eggs of fertile fishes. One of its members, Mr. Millet, having observed that melting ice diminished the pulsations of the young fish of the Salmonidæ and delayed the hatching of the eggs, took the idea that this method would serve for the transportation of eggs of the Salmonidæ to Australia and Tasmania. The plan has succeeded, in spite of damaged eggs; a very large number have arrived there in a healthy state, and have been deposited in the rivers. Starting from London on January 15th, 1864, the eggs arrived at Melbourne on April 5th, and at Hobart Town, (Tasmania,) on the 22d. Everything indicates success.

Similar attempts have been made in the French possessions in Algeria, the rivers of which are very barren of fish. Eggs of salmon and trout have been carried there from Huningue (Haut Rhin), where, as we have previously seen, are found the principal basins for pisciculture. In spite of the differences of climate, these eggs have arrived safely, and have hatched in the basins prepared for them; they already begin to people the rivers. It is a result of no moderate interest to see the salmon of the Rhine and the trout of the Vosges transported to Africa, Australia, and Tasmania, and living and becoming acclimated there.

How to Cook Snails.

Fried frogs are very nice eating. Snails are said to be fine also. We have no passion for snails, personally, but some investigators may have, and we therefore append a plan for cooking them:—

"The large brown snails gathered in gardens are very good eating, and by some persons are very much liked. A year or two ago the master of a French vessel obtained leave to gather them in the garden to take on board his vessel, and they were eaten by the whole ship's company; in return the master was good enough to gather, prepare, and serve the snails up for our family dinner party, which he joined, that he might be certain of the cooking being perfect. The instructions were to use only those snails whose shells were at the edges sufficiently hard to resist the nail without breaking; to be careful not to gather the snails from off either ivy, box, or other evergreen, as snails so feeding were deemed unwholesome; to put them in water with a handful of salt to spit, that is, to cause them to clean themselves; and to boil them gently, when they come out of their shells with ease. We were then to prepare the frying pan with a little lard and parsley, and to fry the snails delicately; they thus form a dish a poor man might feast on and a rich man enjoy. Bread crumbs might be added if liked, and the snails might be stewed, but the mode of cooking just given pleased our family best, and formed a dish we have often tried since we received the instructions from the master of the French merchant trader. Kept for a week or so and fed on oat meal, then fried in oil with vinegar, salt, and pepper, they are considered *bien delicats.—A. C., in Gardener's Chronicle.*

Correction from a Noon Mark.

MESSRS. EDITORS:—Persons who use a noon mark or transit instrument to obtain the time by the sun, are in need of a better table for correction than is found in most of our almanacs. I would call the attention of watchmakers, railroad men and others to the Methodist Almanac, published in your city, as containing the correcttion calculaed in solar time, and given in minutes and seconds for every day in the year. I hope that some of our other almanac publishers will make one step forward in this age of fast traveling, and in their future editions follow the example aforementioned.

The writer for several years made use of a sundial, by which the image of the sun, inverted, was thrown upon a wall fourteen feet distant. The edge of the image produced was so clear and distinct that I was enabled to read the time of the transit of the sun to within two seconds. With the aid of the Methodist Almanac I could regulate my clocks and watches to a greater nicety than they could who depended upon the "town clock." J. A. S., Watch Maker.

516 Callowhill, Philadelphia.

Waste of Ammunition.

How much ammunition is wasted in battle, and how many muskets in the hands of incompetent or cowardly men are actually useless, the following official report of the small arms picked up on the field of Gettysburg strikingly illustrates. The statement has been published before, but we give it again as one of the strongest arguments in favor of a change to breech-loading guns. With breech-loaders it would be impossible to get more than one charge at a time, and a man could tell at a glance whether his piece was discharged or not: Of the whole number received (twenty-seven thousand five hundred and and seventy-four) we found at least twenty-four thousand of these loaded; about one-half of these contained two loads each; one-fourth from three to ten loads each, and the balance one load each. In many of these guns from two to six balls have been found, with only one charge of powder. In some the balls have been found at the bottom of the bore, with the charge of powder on top of the ball. In some as many as six paper regulation caliber fifty-eight cartridges have been found, the cartridges having been put in the guns without being torn or broken. Twenty-three loads were found in one Springfield rifle-musket, each load in regular order. Twenty-two balls and sixty-two buckshot, with a corresponding quantity of powder, all mixed up together, were found in one percussion smooth-bore musket. In many of the smooth-bore guns, model 1842, of Rebel make, we have found a wad of loose paper between the powder and ball, and another wad of the same kind on the ball, the ball having been put into the gun naked. About six thousand of the arms were found loaded with Johnston & Dow's cartridges; many of these cartridges were about half way down in the barrels of the guns, and in many cases the ball end of the cartridges had been put into the gun first. These cartridges were found mostly in the Enfield rifle-musket.

The Preparation of Matches Free from Phosphorus.

Hierpe has published the following receipts for a composition for the heads of matches, and for an igniting surface. That of the matches is as under:

Chloride of potash	4 to 6 parts.
Bichromate of potash	2 parts.
Ferric oxide	2 parts.
Strong glue	3 parts.

The *Polytech. Centralblatt* gives these directions for making two new kinds of matches.

Oxide of iron may be replaced by oxide of lead or of manganese. The above preparation will not ignite on sandpaper, but requires a surface specially prepared for it, and the author employs the following on the boxes:—

Sulphide of antimony	20 parts.
Bichromate of potash	2 to 4 parts.
Oxide of iron, lead, or manganese	4 to 6 parts.
Glass powder	2 parts.
Strong glue or gum	2 to 3 parts.

Another composition is described by Dr. H. Poltzer. A solution of sulphate of copper is divided into two equal parts—one is supersaturated with ammonia, the other with hyposulphite of soda. The two solutions are now mixed, and the mixture is briskly stirred. A violet-colored powder now deposits, which is a compound, says the author, of hyposulphurous acid with oxide and suboxide of copper, soda, and ammonia. A mixture of this salt with chlorate of potash detonates when struck with a hammer, and when rubbed in a mortar ignites and burns like gunpowder, leaving a black residue.

The above salt the author proposes to use for matches. It is not soluble in water, and the mixture with chlorate of potash is not hygroscopic. The mixture may be made with moist chlorate and the gum solution, and can be safely dried at 50° C. or higher. It inflames when rubbed on a rough surface, and the temperature developed is sufficiently high to ignite sulphur on the stick.

The only difficulty the author finds is in making the mass coherent: when dried on the stick he found that it would crack and drop off when rubbed. A manufacturer will probably soon overcome this difficulty.

The proportions made use of were one part of the copper salt, and two parts of chlorate mixed in a sieve, and then made into a mass with solution of gum, together with a little glass powder. This mixture was applied to matches dipped in sulphur as usual.

Pomade Divine.

Take of beef marrow 3 lbs., put it into an earthen vessel and cover it with cold water; change the water daily for a few days, using rose-water the last day. Pour off and press out the water; add to the marrow four ounces of Styrax, Benzoin, and Ohio Turpentine, one ounce of Orris powder, half an ounce each of powdered cinnamon, cloves, and nutmeg. Set the vessel in hot water, and keep the water boiling for three hours; then strain.

TO CURE A "FELON."—As soon as the part begins to swell, get the tincture of lobelia, and wrap the part affected with cloth, saturate it thoroughly with the tincture, and the felon will soon "die"—poisoned instead of hung, as all *felons* ought to be. An old physician informs us that he has known this to cure in scores of cases, and it never fails if applied in season.

Improved Flax Dresser.

This machine is intended to clean and dress tangled flax and render it free from the shoove or woodeu coating in which it is cased, so as to fit it for working. Fig. 1 represents an end view of the machine and fig. 2 a side view. In the first figure a five armed apparatus, A, is shown attached to a disk, B. These arms have scutching blades, C, bolted on them in such a way that they can be adjusted at will to work close to, or farther from, the dressing board, D. This detail is shown in fig. 2, at E. The flax is laid on a trough, F, and fed to the scutching knives by the roller, G. This roller is set in a bell crank, H, which connects by means of a link, I, with the crank, J, below; a counterbalance on the shaft of this crank serves to regulate the pressure on the flax to be dressed, so that it is held firmly and yet fed regularly by the rollers until the scutching knives have removed the shoove. These knives work close to the dressing board, D, and are made self-adjusting by the springs at their backs so that no matter whether the mass to be dressed is thick or thin the office is properly performed. The disk, B, carrying the arms the scutching blades are on can also be set to dress a given amount of fiber. This is done by means of set screws and collars on the shaft the disk is secured to. There is also a screw stop at, *a*, which regulates the descent of the feed roller and prevents it from coming in contact with the dressing board. The woody portions driven off by the scutching blades fall through at the riddle, K, or sieve portion of the casing in which the arms revolve.

The combination of these several parts, it is asserted, produces an efficient and economical machine for the purpose. It was patented through the Scientific American Patent Office on Nov. 29, 1864. For further information address the patentee, William C. McBride, at Raritan, N. J.

Fig. 1

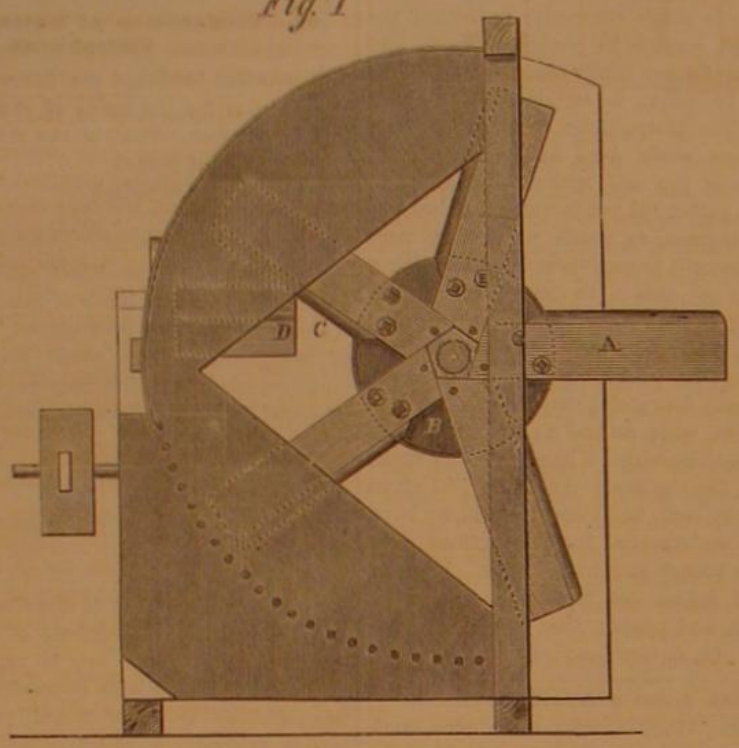
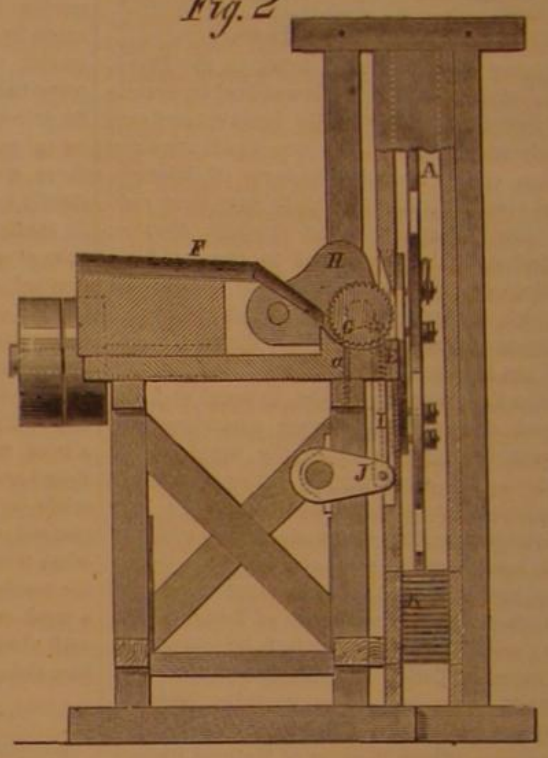


Fig. 2



M'BRIDE'S FLAX DRESSER.

THE METRIC SYSTEM.

When we commenced advocating the adoption of the French system of weights and measures, we were not aware that several co-laborers were zealously engaged in the same work. We have just received from H. E. Johnson, Esq., of Baltimore, Md., a circular published at the joint expense of himself and B. S. Dexter, of Tioga County, N. Y., urging upon Congress the legalization of the metric system.

From this circular we make the following extracts:—"The metric system is used not only in France and her colonies, but several other European nations have adopted it. It is legally established throughout Italy, with the exception of Rome and Venice. Two errors have been committed in Europe, which it is hoped will be rectified and never repeated. In one instance a decimal system has been adopted, founded on a metric system, but not identical with it, and in some instances the names have been, and perhaps still are, entirely unlike the French names. It can not be too firmly impressed upon the public mind that, in order to reap the full benefit of a universal decimal system, there should be, in effect, but one measure of length, one of area, one of capacity, and but one weight, and that the corresponding names in all languages should be nearly alike.

"How can this system be made universal? Every nation should make it the Government standard. The *gram* should be the postal weight throughout the world. Other nations and states should follow the example of Connecticut, and introduce the system into their schools. Let the steps taken be energetic and efficient, for while men buy and sell by different systems inconvenience will be experienced, but when the old system is abolished the inconvenience will cease.

"The long names of the French system constitute an objection which can be easily avoided. They can be abbreviated so that the units will be of one syllable, and the derivatives of two, and yet bearing sufficient resemblance to the French terms to be easily identified. *Metre*, *litre* and *are* should be *met*, *lit*, and *ar*. *Deka*, *hekto*, and *kilo*, should be *Dek*, *hek*, and *kil*. *Deci*, *centi*, and *milli*, should be *des*, *cen*, and *mil*. Then *hektometre* (100 meters), would be *hekmet*, *centimetre*, (1-100 meter), would be *cenmet*. *Hektolitre*, (100 liters), would be *heklit*, and *decilitre* (1-10 of a liter) would be *deslit*.

"As the metric system is entirely decimal no reduction is required, and there is substantially but one measure of length, the *met*, one of the area, the *ar*, one of capacity or cubic measure, the *lit*, and one weight, the *gram*. It is not necessary to point out the irregularities and inconveniences of our present system. How many of the readers of this article can recite our tables of weights and measures without making several mistakes? How many can tell, without calculating, how many feet are in a mile, or how many cubic inches in a gallon?

"It requires but little study to understand the meaning of the terms, *met*, *ar*, *lit* and *gram* and but little mental exertion to remember that *dek*, *hek*, *kil*, indicate respectively 10, 100, 1,000, and *des*, *cen*, and *mil*, 1-10, 1-100, and 1-1000. When these simple facts are learned the metric system is, for all practical purposes, mastered."

If there is any one in this city who takes sufficient interest in the reform to circulate petitions to Congress, Mr. Johnson would like to hear from him.

Real and Ideal.—Is the title of a volume of poems dedicated to Prof. Longfellow, by John W. Montclair. There are several meritorious translations from Heine and other German poets; also some excellent original productions by the author. The book is published by Frederick Leypoldt, of Philadelphia, and is sold by Hurd & Houghton, of New York city.

Tar Making in New Hampshire.

From Effingham, along the northeastern shore of Ossipee Lake (or the Great Pond, as it is locally called), and stretching away toward Conway, there are thousands of acres of pine plains, the timber on some portions having been cut. It is from the roots or stumps that the tar is extracted by a company locally organized for the purpose. The largest timber of these "cut downs" has been cut long enough to have all the sap-wood rotted away, leaving nothing but the clear wood. The Rochester *Courier* says, speaking of a spot near the village of Freedom:

"Here they set their stump-pullers at work, pulling from fifty to one hundred stumps each, daily, according to the difficulties encountered. These stumps are hauled to Freedom village, where they are cut and split into pieces about the size of very fine stove wood, and placed in what is called a basket. The basket is a wrought iron cylinder, punched full of holes of about three-fourths of an inch in diameter, and holding half a cord. This basket is taken by a crane and placed in a retort made to receive it. A round top cast-iron cover is then fitted on tight, with a pipe from the center, which connects with a coil of pipe in a condenser.

"The gas and steam passing off from the top of the retort, and through the condenser, comes forth from a barrel in the shape of an acid (which is worth ten cents a gallon among the calico printers, but is here thrown away,) and a red oil. The red oil is then passed through a still, and gives about half its bulk in spirits of turpentine. The other half is thin tar, which is mixed with that which comes from the retort. From the bottom of the retort the pitch which is 'tried out,' of the pitch wood by the heat applied to it, comes forth in the shape of thick tar. There are eight or ten retorts, which bring forth forty barrels of tar a week, and seven or eight barrels of spirits of turpentine.

"A cord of pitch wood gives about three barrels of tar and eighteen gallons of spirits, besides twice that amount of acid. The company have stumps enough dug to keep the factory running until until they can dig again in the spring; and it is said that there are stumps enough left on the plains to last the company for three or four years. The tar is worth about $14 per barrel and the turpentine about $250. Who but Yankees would have brought down the price of tar and turpentine by digging pitch wood stumps for its manufacture?"

To Petrify Wooden Objects.—Take equal quantities of gem-salt, rock-alum, white vinegar, chalk, and pebbles powdered. Mix all these ingredients; there will happen an ebullition. If, after it has ceased, you throw some wooden objects into this liquid, and leave them soaking for four or five days, they will be transformed into petrifactions.

TURNING TOOLS.

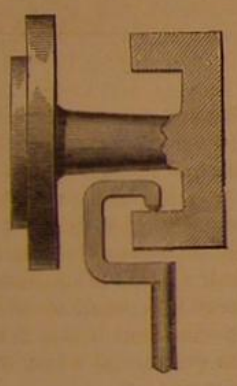
PART FIFTH.

Very many mechanics start the carriage with feed down the lathe shears, and, as the curve falls in on the rod, screw the tool in, thus gradually working out the curve. This may be a good plan where the curve is large, but as it changes its character near the neck of the rod, and becomes concave, instead of convex, the handle must move over a long space very quickly, and it requires good guessing to tell just how much or how little the tool will take. Sometimes it misses entirely or else takes a huge bite, and the latheman trembles lest the next thing his eyes behold will be the six-ton rod flying from its centers and crashing into the bed below, while the general wreck of face plates, cone pulleys, etc., carried down by his mismanagement, tell a piteous tale of want of system and good workmanship.

It is not seldom that similar cases occur. We once saw an impatient turner cutting a screw; when he came to throw the backing belt on to the pulley he slammed the shipping bar with such violence as to spread the counter-shaft hangers overhead apart, and the shaft, belting, pulleys, and all, came thundering down within an inch of his head.

The ingenious turner can readily contrive tools for special purposes, so that by them his work will be greatly expedited. It sometimes occurs that jobs nave to be turned inside and out at one time or without removal from the face plate or mandrel; ordinary tools are then inapplicable. Such an instance is shown below, where the casting has to be turned off inside and out without removal. As the inside cannot be bored with a boring tool (it being next the face plate), a special tool must be used, and one is shown n Fig. 24, in connection with the casting

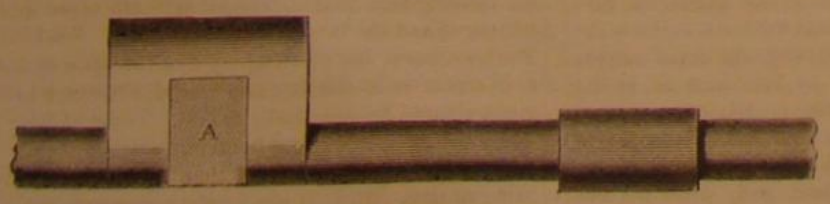
Fig. 24.



It must be borne in mind that we distinctly repudiate the use of such tools unless they are absolutely indispensable. The situation, however, is one that the turner has nothing to do with, and he must not be held responsible for want of good judgment on the part of the designer who contrived such an awkward piece of work. Such a tool as the one shown in Fig. 24, springs and buckles because it has no direct support or bearing from the shank, and cannot be used at all with a heavy cut.

In the manipulation of heavy crank shafts much care and good judgment is requisite. Crank shafts for inside connected locomotives and screw engines are made in one mass, and it is a costly piece of work to finish them. For large marine engines, crank shafts of many tuns in weight are sometimes built up of made in separate pieces and shrunk together. By this method they are not only as good as solid shafts, but better, for in the crank and pin the fibers of the

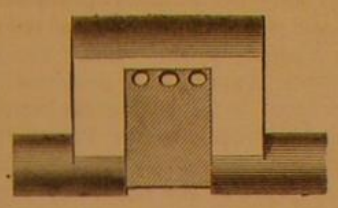
Fig. 25.



iron run in the direction of the greatest strain. The case is quite different in solid forged cranks. When properly shrunk together the parts are immovable by any ordinary power. The *Golden Gate*, of the Pacific Mail Steamship Company's line, has a composite center shaft of this kind, which weighs over twenty-five tuns.

To return to the solid crank shaft (Fig, 25). It is customary to cut the center piece, A, out at the slotting machine, but this is sometimes impracticable, owing to the size of it, or other causes. It is also drilled out, but these several operations involve more labor than when done in a lathe. The block is first cut out by drilling holes along the line of the crank pin, as in this diagram, and then running a square-

Fig. 26.



tool up to the holes. By this plan much handling of the shaft is prevented, for when the block almost drops out, the turner can detach it with a hammer and chisel and then go on and finish the pin up, without the trouble of taking out or putting it on the lathe so often. When the shaft is long it is a very troublesome piece of work to handle. There are strong cast-iron heads keyed on to the ends of the shaft, in which are centers to turn the pin on, balance weights must be put on the face plate of the lathe to compensate for the weight of the cranks. For want of these balances the work is very often spoiled. The crank being the heaviest has a tendency to fall forward immediately after passing over the top center. The back-lash of the back gear, which is always in, allows it considerable motion, so that a very little is enough to make it mount on the tool and break it off or else cut into the surface of the pin and destroy its truth. All the centers must be well screwed up, and the lathe centers, especially, have a fair bearing, or else they will work out of correctness and make the crank pins and journals oval instead of round.

When the square-nosed tool is run in it must have a narrow steel shore under it, so fitted, in a slight depression on the lower side of the tool, that it can not fall out when the tool springs, as it does after every cut; very many turners make the tool with a deep belly, so that it is strongest in the direction of the cut.

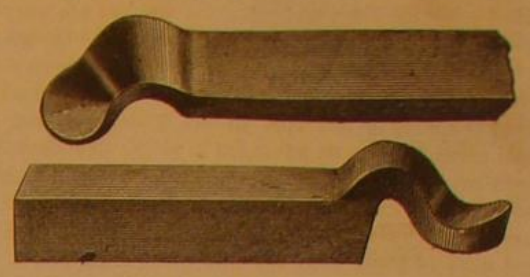
As the tool advances the shore advances with it, and the bottom of it rests in a shallow groove at the foot of the tool post. The tool should not have a lip on it, nor much rake, and the shaft must run slow and steadily. The feed must also be regular and even, and with these precautions, there is little or no danger of jumping it into the work.

Another very difficult tool to manage is the common straight cutting-off tool. There is no reason why this should be so, but it is a fact and will be universally acknowledged by machinists. The trouble arises from a want of care in making the tool. It merely requires to be straight from its cutting edge and sides down, not glanced or rounded off.

It is almost impossible to indicate in an engraving the slight amount of end roundness which will spoil the action of the cutting-off tool. If the corners of the sides are rounded over, even slightly, the tool is in danger of catching and breaking off, while, if the front or cutting edge be also an indirect line, it is liable to be drawn down instead of taking a direct hold on the work.

On page 35 of this volume, and in connection with this subject, we gave an illustration of a straight finishing spring tool, and specified some of the uses cutters of this class were applicable to. They come in play in putting the final touches on the crank pin, for here the tool has to be extended a long distance from the support, and a common solid tool is in danger of springing and forcing the edge in. The spring partition must be made light enough to yield when a heavy strain comes on the edge, and yet sufficiently strong to carry a moderate feed without causing the surface to be irregular. The round corners are apt to be full of chatters when the solid or stiff tool is used, but with this tool the fillets will be, when used in connection with water, of the most beautiful character that it is possible to imagine. In these figures,

Fig. 27.



27, an illustration of a round-nosed filleting tool is given, which works well and gives good satisfaction when properly used.

Production of the Sexes.

What are the causes of the production of the sexes? This question, which has occupied the earnest attention of physiologists, has been thoroughly studied by Mr. Thury, according to whom the product is always of the male sex when the fertilization of the ova occurs at complete maturity, and is always female when it takes place at a less advanced period.

There is a very simple way of solving this problem. It is to select for experiment species that come to maturity in succession, and, that during a single impregnation, fertilize the whole series of ova which detach themselves from the ovary during a period of eight, ten, twelve, fifteen, or even eighteen days. We know, indeed, that, in the case of the hen, a single coupling suffices for the fertilization of five, six, or even seven eggs which she is about to lay and which are arranged in her ovary in the order of their maturation. Now, in such a case, if the theory is exact, the first egg laid ought always to produce males and the others females without any possibility of the inversion of this order.

This is very near what has been observed by Messrs. Coste and Gerbe :

A hen, separated from the cock at the time of her first laying this year, gave five fertile eggs in the space of eight days.

The egg laid on March 15th produced a male ; that on March 17th a male ; that on the 18th a female ; that on the 20th a male ; that on the 22d a female.

A characteristic fact in this experiment is the production of a male after a female, which ought not to have taken place according to the theory. But is it only a simple exception? Or is it necessary to consider the fact a radical objection? We may learn by and by on this point, from the researches in which Mr. Gerbe is now engaged.

On the occasion of the preceding note, Flourens recalled an experiment which he made, thirty years ago.

"Aristotle had observed that the pigeon ordinarily lays two eggs, and that of these two eggs one commonly produces a male and the other a female. He wished to know which was the egg that gave the male, and which the one that produced the female. He found that the first egg always gave the male, and the second the female. I have repeated this experiment as many as eleven times in succession, and eleven times in succession the first egg gave the male and the second egg the female. I have seen again that which Aristotle saw."—*Silliman's Journal.*

The Phrenological Journal.

This able publication continues to be the only periodical now printed, either in this or any other country, whose pages are wholly devoted to the consideration and study of physiology, phrenology, physiognomy, and all the latest ologys. These, at first blush, seem to be dry subjects. But a perusal of a single number of the *Phrenological Journal* will show that the theme of the Mind, and its various physiological indications are among the most comprehensive and deeply interesting things to which attention can be given. No person can be said to be well informed, much less, educated, who is unacquainted with the principles of mental philosophy as revealed from the stand point of modern Phrenology. S. R. Wells, Editor. Monthly, illustrated $1·50 a year. 389 Broadway.

EDITORIAL CORRESPONDENCE.

WASHINGTON, Jan. 17, 1865.

Washington presents all the life and animation that usually mark the period immediately succeeding the holidays. All the hotels and boarding-houses are filled to overflowing, and private residences are very difficult to be obtained. Since the passage of the act of Congress authorizing the enlargement of the Capitol and Treasury buildings, which indicates a permanent retention of this spot as the Federal Capital, real estate has greatly advanced in price; fine dwellings have rapidly increased; rents are very high, and many improvements have been introduced, prominent among which are the extensive water works and the net work of horse railways now completed and in progress. These add much to the convenience of the people in this "city of magnificent distances," and, thus far, greatly benefit those who have secured charters for the roads, which are admirably built and furnished, and, so far as I could judge, are well managed.

What a wonderful improvement on the old omnibus system, which is rapidly becoming obsolete, are these tramways on city thoroughfares. Omnibuses can neither compete with the rail cars nor can they accommodate the increasing demands of city travel, and the ignorant prejudice against tramways is dying out in proportion as the people experience their great benefits.

Since my last visit to Washington a marked change for the better is quite apparent. Then the streets were thronged with soldiers, horses, mules, cattle, army wagons, and other appendages of military operations, while the hotels were overrun with the shoulder-strap gentry, and, I must say, often to the discredit of the service, and much to the annoyance of the guests. The city was also a beleaguered city; the rebel hosts with their defiant banners, were hugging closely its outer ramparts, causing, meanwhile, most manifest uneasiness on the part of the residents, which those who were far away, in snug and safe quarters, could not appreciate. Many of the Departments were barricaded, and the employees generally armed to assist in repelling a threatened attack. Thanks to Gen. Grant and his brave troops, the scene is changed—Washington has nearly returned to its normal repose: a few sentinels pace their weary rounds; mounted guardsmen to patrol the streets are well nigh dispensed with, and in all the Departments there is the bustle of active and almost unceasing official duty.

THE PRESIDENT AND INVENTORS.

The first reception for the season of the Chief Magistrate was perhaps the most brilliantly thronged of any that I have ever before attended. Members of the Cabinet, Judges, Senators, Foreign Ministers and attaches, officers, soldiers and citizens, were there to pay respect to the Executive head of the nation. These great gatherings evince, perhaps, what was proved at the ballot box—the general popularity of the President—for, irrespective of any mere partisan idea, which is unworthy of being cherished as a ground of personal disrespect, I could not fail to regard with gratification the general good feeling which was manifested toward his person, despite a homely and somewhat awkward figure, the effect of which is greatly lessened by personal contact. He seemed not to tire of the constant hand-shaking, which is the citizen's prerogative on such occasions, but maintained a constant flow of genial mirth, an element in his nature which has lightened very much the heavy weight of care that rests upon him as President of the Republic.

I was much pleased to learn that in the midst of the many cares that press upon the President he is not indifferent to the claims of our inventors. Himself an inventor and patentee, he readily discerns the intrinsic value of all good inventions, not only to the public service, but also in their application to the industrial arts generally, and he will do all in his power to encourage and to promote the progress of these arts, by sanctioning all wise legislation in behalf of inventors.

The reception of Speaker Colfax, who is really one of the most genial and popular men in Washington, was attended by many of the most eminent men in the nation.

THE PATENT OFFICE.

My first interest very naturally centered in the Patent Office. Here I found Mr. Holloway and his efficient Chief Clerk, Mr. Hays, aided by a well-chosen and intelligent Board of Examiners and clerks, prompt and laborious in the discharge of their duties. I think I am warranted in saying that, on the whole, the Patent Office was never better conducted than now. I learn from inquiry in the office, and the records establish the fact, that the applications made through the Scientific American Patent Agency amount to nearly one-half of the whole that are presented, and the uniform testimony of the Examiners is, that the cases of no other agency are more carefully prepared. This certainly speaks well of the experience and admirable efficiency of the most extensive patent agency in the world. The influence of the SCIENTIFIC AMERICAN has done vastly more than any other agent in promoting the ingenuity of our people, and in building up the Patent Office to its present gigantic proportion. This fact is now thoroughly recognized in the office, and very naturally exerts its proper influence upon all officers of the Department. They regard this journal as the active supporter and ally of the office.

The Patent-Office building is now complete, and workmen are busy in fitting up cabinets in the large hall of the north front for the reception of models. Three other immense halls are now entirely devoted to this purpose, the average length of each being about 275 feet by 70 feet in width. A few years hence these all will be filled with the trophies of American ingenuity, and what will then be done with them is a question which even now begins to force itself upon the mind. Either a new building will have to be erected for their reception, or the law must be so amended as to entirely dispense with models. The amount of money and of patient labor invested in these miniature machines is almost incredible. The large hall over the main entrance to the Patent Office—once occupied as a national gallery or museum—is now the center of much interest, and is called the "Salle des Beaux Arts," or hall of fine arts. The decorations are novel, fanciful, and, in some respects, beautiful. Here is the only instance in this country, I believe, where the art of polychromy has been elaborately applied to the interior decorations of a public edifice. Hittorf, a celebrated traveler and explorer, published many years ago the result of his discoveries in this art as it was applied to the adorning of ancient monuments and architecture in Greece and Sicily, and since that time men of truly artistic taste have searched diligently for corroborative proofs of the facts asserted in his writings, and considerable has been done in Europe to make this art subservient to the interior decorations of public buildings.

The ceilings and pilasters of the new hall of fine arts are very chaste and beautiful, certainly as fine as anything of the kind I have before seen. The immense stone columns that support the barrel arches of the hall are painted in deep ultramarine, while the pedestals upon which they stand are painted black, relieved by white lines. Considerable unfriendly criticism has been bestowed upon these heavy blue columns, yet in the face of all such censure, and after a careful study of the effect produced in the wonderful blending of other colors, such as red, yellow and green, I think the conception, on the whole, is truly artistic. The black and white striped pedestals are in the worst possible taste, and ought to be redecorated at once. They look like big tea chests, and create the impression that they are doing their best to support a very heavy weight. Some will judge that these decorations were suggested by the arts of painting as practised by North American Indians, while others, and I think the larger portion, will regard them as the results of a truly cultivated taste.

Workmen are now engaged in this hall of fine arts in putting up handsome walnut cabinets, and it is the design of Commissioner Holloway, out of the surplus funds of the Patent Office, to introduce, as in the Conservatory of Arts in Paris, models of machinery and tools illustrating all the principal industrial arts of the country, as glass-making, sugar-refining, etc. The idea is a magnificent one, and, if carried out with good judgment and skill, the hall will become a point of the greatest interest and instruction to visitors. I wish that New Yorkers could be stirred up to establish just such a museum in the Central Park; it would be wonderfully attractive.

PATENT EXTENSION CASES.

Not much is doing at the present session of Congress in reference to Patents or the Patent Laws. In the House Committee on Patents, of which the Hon. Thos. A. Jenckes, of Rhode Island, who is well known to the readers of the SCIENTIFIC AMERICAN as one of the ablest patent lawyers of the country, is chairman, several extension cases are now pending its action, prominent among which are the Goodyear India-rubber patents which expire in June next; McCormick's Reaper; Fitzgerald's Fire-proof Safes, and others of less note. As the session will be a short one, and there is an *immense press* of public business, it is doubtful whether Congress will be able to consider all the cases before the Committee. The Goodyear case is receiving most attention, and may be brought forward. The heirs of Goodyear, who are said to be really quite poor, have, as I understand, modified their petition, and instead of asking an extension of the patents by act of Congress—a species of legislation which the SCIENTIFIC AMERICAN has always opposed—now apply for a bill to refer the case to the Commissioner of Patents, with power to hear testimony, as in all other cases of extension under the general law, and to decide it judicially upon law and evidence. This course is far preferable to the custom of besieging Congress to act directly in such cases.

PATENT LAW AMENDMENTS.

There is also pending before the Senate and House Committees a bill to amend the act of March, 1863, which requires the balance of the patent fee of $20 to be paid within six months after date of allowance, in default of which the invention becomes public, *as against the appticant only*. Under this stringent law many meritorious inventors—among whom are soldiers in the army on active duty—actually lose their patents; besides, the office suffers many inconveniences, and loses much revenue. The Commissioner of Patents warmly indorses the amendment, and I had the honor to present its merits to both Committees—the House and Senate. The relief, if granted at this session, will affect all cases now before the office, of which there are thousands. There is not a particle of opposition to the measure. Senators Cowan, Ramsey and Lane, also Mr. Jenckes, have all expressed themselves favorable to the proposed bill, and I have no doubt it will pass at this session. Applicants for patents whose interests are thus placed in jeopardy, ought to write to their Members of Congress, urging them to help the bill along

NATIONAL CURRENCY BUREAU.

During my visit I have been permitted to examine all the nice operations connected with the manufacture of ordnance and ammunition at the Washington Navy Yard, descriptions of which I do not feel at liberty to give. I was also permitted by Secretary Fessenden to visit the currency bureau of the Treasury Department. Persons are not allowed to visit this bureau for purposes of mere curiosity; therefore few passes are granted. As a matter of scientific interest I was honored with a pass, and witnessed every operation connected with the preparation of our issues of Government bonds and currency. I will not undertake to describe how five-twenties, ten-forties, greenbacks and the fractional currency are so beautifully and satisfactorily produced. This is quite well done on page No. 114, last volume, SCIENTIFIC AMERICAN, to which the reader is referred.

Upon entering the bronzing room I was greeted by Mr. Dunn, one of our former patrons. He has invented a very ingenious and beautiful machine for bronzing the currency; or, as some one has said, "to give it a metallic ring." It is, I believe, the only good machine for the purpose. There are also some ingenious machines for cutting the sheets of currency into parts and counting the exact numbers cut. Some recently-improved machines cut both ways at the same operation.

The question of dry printing by hydrostatic pressure, to which reference is made on page No. 294 of our last volume, is practically settled. Some eighty of these presses are printing fractional currency, and it is done more rapidly, I think, than by the process of wet printing. There is less manipulation required, while the work is finished in a superior manner. The dry process is gaining favor rapidly.

In the absence of Mr. S. M. Clark, the superintendent, I was shown through the bureau by Mr. E. H. Dougherty, his efficient assistant. Hundreds of

men and women are here employed, and many millions of bonds and currency have passed through their hands, thus far without the loss of a dollar. There were at the time of my visit upward of one hundred and thirty millions of dollars in the iron vaults.

* * *

PROFESSOR PAGE THE INVENTOR OF THE RUHMKORFF COIL.

[For the Scientific American.]

In the SCIENTIFIC AMERICAN of Jan. 2d, 1865, you have described the Ruhmkorff coil to consist of the following parts:—a primary coil of insulated wire surrounding an electro-magnetic case consisting of a bundle of wires of soft iron, a secondary coil of fine wire of great length and carefully insulated, surrounding the primary coil, and a vibrating hammer or automatic circuit breaker. On connecting a small galvanic battery with the primary coil, the hammer is immediately set in motion, and the rapid breaking of the circuit caused by its motions produces currents of high intensity, and some of the brilliant appearances of statical or frictional electricity. It might have been added that Fizeau suggested the use of a peculiar condenser with the Ruhmkorff coil by which its electrostatic properties were displayed with great splendor. Having been informed that the instrument thus described as Ruhmkorff's was the invention of Prof. Page of Washington, I have taken some pains to inquire into the facts, and find that the entire instrument was made by him in 1838. The following facts appear in the public records of the Patent Office:—

"On the 2d of February, 1854, Prof. Page applied for a patent for an instrument identical in all its parts with that described as the Ruhmkorff coil. The Patent Office, upon a hasty examination, at first refused the claim upon the ground that the automatic circuit breaker, in connection with the induction coil, was described by D. Golding Bird, in the *London, Edinburgh and Dublin Philosophical Magazine*, for January, 1838. It so happened that the office had failed to notice the conclusion of Golding Bird's communication in which he says, "the credit of the invention must be given to Dr. Page." Attention having been directed thereto the Patent Office admitted Prof. Page's claim to originality, but subsequently refused the patent upon the ground that the invention had been dedicated to the public. How far this invention anticipated the Ruhmkorff coil will be seen from the descriptive catalogue of Daniel Davis, of Boston, published in 1840, in which he says that this induction coil affords a "light between separated charcoal points," and "charges the Leyden jar." The instrument is there called the "compound magnet and electrotome," and was subsequently made and sold under various names, such as "Page's Analysis of Shocks," "Separable Helices," etc. The identical instrument I find described in *Silliman's Journal*, Vol. XXXV., Jan., 1839. The electrostatic powers of this instrument as described are fully equal to the past editions of the Ruhmkorff coil, and I have been shown a programme of experiments recently made at Public School, No. 11, Brooklyn, N. Y., in which occurs the following announcement, "Page's Analysis of Shocks same as Ruhmkorff's Coil." These experiments were conducted by N. B. Chamberlain, of Boston. Mr. Chamberlain exhibits the sparks, the charging of the Leyden jar and all the beautiful experiments with the vacuum tubes with Page's coil, precisely as they are performed with the Ruhmkorff, the only difference being that the Page coil is on a smaller scale and much less expensive.

The intensifying power of the bundle of iron wires in the coil was discovered by Prof. Page and published by him in *Silliman's Journal*, Vol. XXXIV., for July, 1838, and the first application of it within the induction coil led to the development of its electrostatic properties.

With all these facts before us it is evident that the so called Ruhmkorff coil was the invention of Prof. Page, and the Imperial award of 50,000 francs to Ruhmkorff by the French Commission must have been made in entire ignorance of Prof. Page's claims, an oversight of American achievements by European savans already too common.

New York, Jan. 16, 1865. S. H. W.

Correspondence

Cone Pulleys for Given Velocities.

MESSRS. EDITORS.—In a late number of the SCIENTIFIC AMERICAN is a method of ascertaining the diameters of cone pulleys, which will do when definite velocities are not required, but as that is sometimes a desirable end I send the following rule:—Suppose the velocity of the upper or driving cone to be 100, the joint diameter of the two cones 20 inches, and the velocities required 75, 150, 225, 300. Write down the velocities required as above, and under each write that of the upper cone; add them together, and set the amounts under, as in addition, and make each amount the denominator of a fraction, of which the velocity of the upper or driving cone, say, is the numerator. Multiply the joint diameter, 20, by each of the fractions so found, and the products will be the several diameters of the pulleys upon the driving cone. The same operation, repeated with the velocities sought, as denominators, will give the diameters of the driven cone. Example:—

75	150	225	300
100	100	100	100
175	250	325	400

$100 \div 175 \times 20 = 11\frac{3}{7}$
$100 \div 250 \times 20 = 8$
$100 \div 325 \times 20 = 6\frac{2}{3}$
$100 \div 400 \times 20 = 5$

$75 \div 175 \times 20 = 8\frac{4}{7} + 11\frac{3}{7} = 20$
$150 \div 250 \times 20 = 12 + 8 = 20$
$225 \div 325 \times 20 = 13\frac{1}{13} + 6\frac{2}{13} = 20$
$300 \div 400 \times 20 = 15 + 5 = 20$

It may be objected to this method that it does not make allowance for the angle of the belt; but in the above example I find the variation to be but ·1 in a distance of 6 feet between shafts—a difference which would scarcely be perceptible in the tension of the belt. If, however, the distance at which the shafts are known are to run is known, and it is desirable to be accurate, one of the cones may be set back of the lathe the proper distance, and the others may be turned by a tape line until the tension is equal upon all the pulleys. I have found this to work well in practice, and it is simple enough to be within the reach of any mechanic who is likely to have cones to make. S. H. WILDES.

Central City, Col. Ter., Dec. 21, 1864.

Rules for Measuring Grain.

MESSRS. EDITORS:—I venture to offer you for publication the following rules for measuring grain. Dimensions are taken in inches, and the Winchester bushel—the standard of the United States—contains 2150·42 cubic inches:—

To measure grain in a bin, multiply the product of the length, breadth and depth by 10, and divide by 21504 for the number of bushels.

To measure grain in heaps:—Multiply the sum of the perpendicular and slant hights, their difference, and the perpendicular hight together, and the product by ·00048 when it is heaped in the middle of a floor; by ·00024 when heaped against the sides of a barn; by ·00012 when it is heaped in the corner of a barn; and in each case the last product will be the answer in bushels.

The second statement may be demonstrated thus:—Let a equal the slant hight, and b the perpendicular hight. Then a^2-b^2 equals the square of radius of base of heap, and $(a^2-b^2)3{\cdot}141592$ equals area of base of heap, and $(a^2-b^2)3{\cdot}141592\times b\div 3$ equals the solid contents of heap in inches, which being divided by 2150·42 and reduced, equals $(a^2-b^2)b\times{\cdot}00048$, which, since $a^2-b^2=(a+b)(a-b)$, becomes $(a+b)(a-b)b\times{\cdot}00048$. Q. E. D. M. V. B. P.

Danville, C. E., Dec. 1864.

Hand Carding, Spinning, and Weaving.

MESSRS. EDITORS:—I have been a constant reader of your valuable Journal for many years, and have come to regard it as the fountain of knowledge.

This island is very much in need of a hand carding, spinning, and weaving machine for working up the cotton grown here. As labor is very cheap, many girls who are unable to do field work might make a livelihood at this branch of business. Can you inform me where such a machine can be purchased, and at what price, or with whom I can correspond in regard to the matter? JOHN MCDONALD.

Kingston, Jamaica, Jan. 6, 1865.

HARDENING AND TEMPERING STEEL.

Steel is hardened by being heated a bright cherry-red, and plunged in cold water. The brittleness and hardness are then modified by gradually warming the metal, either over a fire, or by placing it on a hot metal plate, or in an oven, or in an oil bath. Some large manufacturers of cutlery use a tempering oven, the temperature of which is regulated by a thermometer. This saves a great deal of high-priced labor, and secures a uniform result. The following degrees of temperature and corresponding colors of the steel, for different purposes, are given in many books:—

Corresponding Temperature.		
A very pale straw.....430°	Lancets	
Straw.....450°	Razors	
Darker straw.....470°	Penknives	All kinds of wood tools
Yellow.....490°	Scissors	Screw taps.
Brown yellow.....500°	Hatchets, Chipping Chisels. Saws.	
Slightly tinged purple 520°		
Purple.....530°	All kinds percussive tools.	
Dark purple.....550°	Springs.	
Blue.....570°		
Dark blue.....600°	Soft, for saws.	

GUNS BURSTING IN ACTION.

At the first attack on Wilmington no less than six 100 pound Parrott guns are said to have burst. These guns are the best service guns in the world, and are acknowledged as such by unprejudiced persons. At the last attack on Wilmington, two fifteen-inch guns burst, doing but little injury, fortunately, to those in their vicinity. This will be hailed by those who condemn cast iron ordnance as proof positive of the correctness of their assertions, but it is no more evidence of the unfitness of cast iron for artillery than the explosion of a boiler shows wrought iron to be unfit for generating steam. In the excitement of battle very many exigencies arise, and omissions occur which frequently result in disaster, and it is mainly to such causes that we attribute the recent failure of the Parrot rifles and the large guns.

The official investigation at Washington into the explosions in question will, we hope, result in some specific verdict and make the true cause public.

Another Iron Letter.

In our impression for Dec. 2nd we described an iron letter, the pages of which were rolled at the Sligo Ironworks, Pittsburgh, Pennsylvania. The makers claimed that this iron was the thinnest ever produced. During the present week we have had some specimens of sheet iron brought under our notice which are nearly one-tenth thinner than the iron of the American letter. The plates were rolled by Messrs. T. W. Booker & Co., Mellingriffith Works, Cardiff. They are barely the 1,000 part of an inch in thickness. A piece 8 in. long by $5\frac{1}{2}$ in. broad, weighs $62\frac{1}{2}$ grains only. The quality of the plates is admirable. They possess toughness and flexibility in no ordinary degree. We have very little doubt that these plates are the thinnest ever produced.—*London Engineer.*

THE enormous demand that has sprung up for the series of dyes that are prepared from coal has probably no parallel in the history of color manufactures. Mauve, magenta, girofila, and other popular colors are all produced by scientific treatment of certain substances that are produced during the distillation of coal. It is said the discoverer of these dyes was a lad in the City of London School, now grown to man's estate, and enjoying an income of several thousands a-year as his share of the profits of the manufacture of these dyes.

IN Hitchcock's "Method of Forging Cannon," published on page 50, current volume SCIENTIFIC AMERICAN, some typographical errors occurred which changed the sense; the rings are said to be formed in a modification of the *tin* rolling machine. It should read *tire* rolling machine.

Sliding Door Roller Sheaves.

The accompanying illustrations exhibitan important and simple improvement in sliding door sheaves. The wheel instead of revolving in a confined socket, rolls along a horizontal plane; the axle of the wheel moving the length of the slot in the same time that the wheel travels the length of the track.

By this arrangement the superior advantages of a roller over those of a wheel are secured in moving a door, the bed of a printing press, or any other burden which has a reciprocating motion. In the ordinary form the roller is inapplicable to a sliding door; but, by a modification, as exhibited in this sheave (Fig. 1), where the burden presses upon an axle instead of upon the periphery of the roller; the distance traveled by the roller is so much lessened that its application to the sheave is quite practicable.

Fig. 1.



The length of the slot is dependent upon the distance the door is required to travel; also upon the relation between the circumference of the wheel and that of the axle. In ordinary doors the length of the slot is about three inches long.

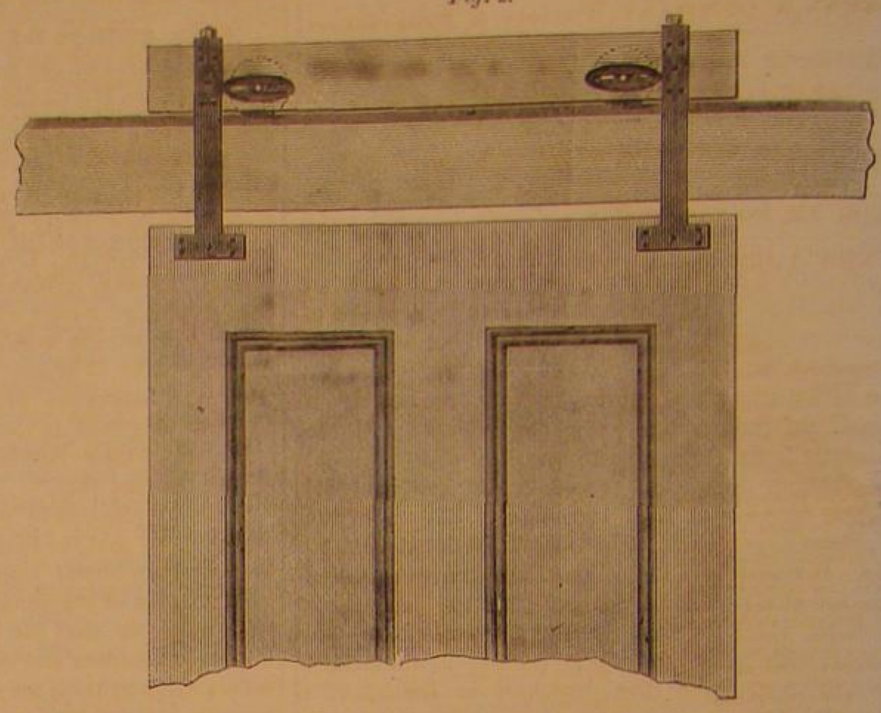
One advantage obtained by this improvement, as above shown, is the diminished friction and consequent ease of motion, but this is not the principal advantage. In common sliding door sheaves it has been found difficult to lubricate the working parts, and in consequence it is found after a year or two that the axle is ground away. This is so serious that the door settles gradually until it comes in contact with the floor or with the track and thereby prevents the moving of the door except by great exertion. The roller sheave most effectually prevents the occurrence of this evil, and herein is its principal advantage; for, there being no friction between the axle and the plane upon which it rolls, neither of them can wear away; hence the door must remain at the hight at which it was at first placed, and continue to move with ease for any length of time.

It is sometimes desirable to have the sheaves placed at the top of the door, in order to have the floor free from the track for the extension of a carpet beneath or for other reasons.

Doors may be hung at the top by this sheave, as shown in the engraving (Fig. 2), where two sheaves are inserted in a plank and placed above a beam carrying the track, over the door. The door is suspended by iron straps on either side of the beam, passing over the plank as an inverted stirrup. A screw inserted in this strap on top of the plank, raises or lowers the door at pleasure. The straps or stirrups slide up and down in a slight groove on the sides of the plank. In some cases, where it may be difficult to get at the screw so located, it is placed just above the door, the stirrups being secured, in this case, to the plank and made movable on the door. This arrangement for raising and lowering a door has been found advantageous in adjusting the joint between the two doors when they are in pairs; also the joint at the bottom where it meets the floor.

These sheaves are manufactured by Messrs. Newman, Onderdonk and Capron, No. 1,172 Broadway, New York. The invention was patented May 5, 1863, and June 21, 1864. Any information may be had by addressing the manufacturers.

Fig. 2.



SLIDING-DOOR ROLLER SHEAVES.

Improved Mill-Stone Pick.

The inventor of this implement claims to have had long experience in this department of manufacture, and for a number of years past has been experimenting with a view to the production of an edge that would stand. The edges are hardened on a peculiar plan, and, compared with the old-fashioned pick, are acknowledged to be superior. The first cost of these picks will not exceed one-third that of the common tool, and the inventor asserts that one edge of this will out-last thirty of the common kind. They can be ground until worn out, and never need dressing. Another advantage in this pick is, that it is always the same tool, so that, having once become accustomed to its use, the work can be done with much more expedition and satisfaction than where change is continually made.

This fact may appear singular to impractical men, but it is nevertheless true, and a machinist that has the hang of his hammer, the carpenter of his saw, or the miller of his pick, will miss the familiar feeling, and work awkwardly if he is continually changing one for another. The weight can be added to or taken from at will by simply increasing the dimensions of the box. The details of the pick are merely a solid box head,, A, having the pick or cutter, B, confined in it by means of the teeth, C, and wedge, D. The teeth prevent the tool from moving up, and the wedge holds the same firmly in its place. It is also quickly detached for grinding, and in many other respects a most convenient tool, and desirable improvement over those generally used. The cutters are furnished by the manufacturers, D.C. Stone & Co., by whom this invention was patented through the Scientific Am. Patent Agency. The patent has been ordered to issue, and the claim will appear next week. For further information address the patentees at Kingston, N. Y.

Fig. 1

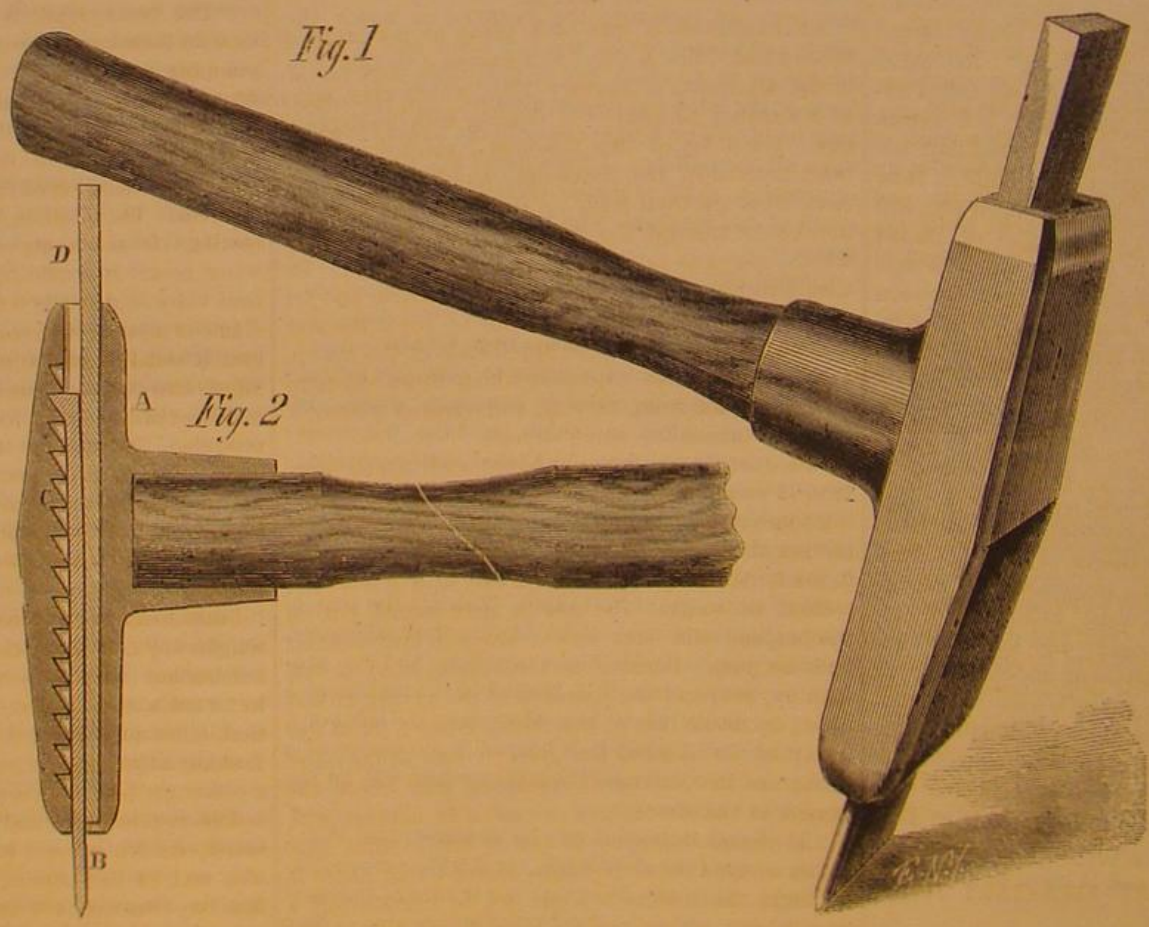


Fig. 2

STONE'S MILL-STONE PICK.

Crystallized Tin-plate.

Crystallized tin-plate is a variegated primrose appearance, produced upon the surface of tin-plate, by applying to it in a heated state some dilute nitro-muriatic acid for a few seconds, then washing it with water, drying and coating it with lacker. The figures are more or less beautiful and diversified, according to the degree of heat and relative dilution of the acid. Place the tin-plate, slightly heated, over a tub of water, and rub its surface with a sponge dipped in a liquor composed of four parts of aquafortis, and two of distilled water, holding one part of common salt or sal ammoniac in solution. Whenever the crystalline spangles seem to be thoroughly brought out, the plate must be immersed in water, washed either with a feather or a little cotton (taking care not to rub off the film of tin that forms the feathering), forthwith dried with a low heat, and coated with a lacker varnish, otherwise it loses its luster in the air. If the whole surface is not plunged at once in cold water, but if it be partially cooled by sprinkling water on it, the crystallization will be finely variegated with large and small figures. Similar results are obtained by blowing cold air through a pipe on the surface in passing from a fused to a solid state.

THE

Scientific American.

MUNN & COMPANY, Editors & Proprietors.

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

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

VOL. XII. NO. 5....[NEW SERIES.]....Twentieth Year.

NEW YORK, SATURDAY, JANUARY 28, 1865.

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THE SIZE OF HOLES IN FURNACE DOORS.

Carbon combines with oxygen in two proportions; one atom of carbon combining with one of oxygen to form carbonic oxide, C O, and one atom of carbon combining with two of oxygen to form carbonic acid, $C O_2$.

When an abundance of air is passed through a grate into the lower portion of a mass of red hot coal, each atom of the burning carbon combines with two atoms of oxygen to form carbonic acid gas. But if this gas struggles upward through a mass of red hot coal, where it is subjected to the action of an excess of carbon, each of its atoms gives up one atom of oxygen, becoming carbonic oxide, while the atom of oxygen given up combines with an atom of carbon also forming carbonic oxide.

As this carbonic oxide issues from the upper surface of the mass of coal, if it encounters atmospheric air at a red heat, each atom will combine with an atom of oxygen, forming again carbonic acid.

These facts indicate very clearly the proportion of air to be admitted above and below the grate. Each atom of carbon receives one atom of oxygen from below the grate to burn it to carbonic oxide, and one above the grate to complete its combustion to carbonic acid. Therefore one-half the air should be admitted below the grate and the other half above.

This conclusion, however, supposes the depth of coal in the furnace to be sufficient to effect the decomposition of all the carbonic acid formed, and the condition of the fire box such that all of the carbonic oxide issuing from the incandescent coals will be burned, provided air is present. Would it not be well to have these questions determined in the costly government experiments which are in progress?

DISPATCH FROM ASSISTANT SECRETARY FOX.

The following dispatch explains itself:—

WASHINGTON, Jan. 18, 1865.

MESSRS. EDITORS:—Your accurate appreciation of the monitors is finally vindicated off the coast of North Carolina, and I congratulate you upon the results. G. V. FOX, Asst. Sec.

SUGGESTION TO INVENTORS.—During our recent visit to the National currency bureau at Washington, we noticed that all the money packages were bound into packages by hand. It occurred to us at the time that some machine might be devised for this purpose.

A SENSIBLE NEW YEAR'S GIFT.

We have read with much satisfaction that very many employers during the past season improved the opportunity afforded by Thanksgiving to present each of their employees with a fat turkey in honor of the occasion. That this is a wise course none can doubt. So long as the memory of the turkey remains the services of the recipient will be zealous and the cost of the gift made up tenfold in the amount of work performed within a given time.

One instance however has come to our knowledge wherein the feast of fat things given by a manufacturing concern to its workmen was of more value than many turkeys. The Blake & Johnson Manufacturing Company, of Waterbury, Conn., last New Year's day, presented a copy of the SCIENTIFIC AMERICAN for one year to each workman in their employ. As our informant, Mr. William Patten, news-agent, through whom the papers are procured, tersely states, "the paper is furnished to the workmen as an acknowledgement of their faithful and satisfactory services during the past year."

It is very pleasant to record this fact, for it proves two things; that the Blake & Johnson Manufacturing Company are liberal employers and that their artisans are men of standing in their calling. When we hear, as we do, that the workshops in question are models of neatness and system, and that the jewellers' rollers made by them are superior to all others in this country, we feel that we only render simple justice to skilled workmen and business tact in making these facts public. Some steel rollers were once made by Messrs. Blake & Johnson for the English mint from American steel procured at Pompton Plains, N.J., and we have seen notices in a prominent English journal that these were the most serviceable rollers the mint ever possessed. We doubt not that the generosity of the firm in question will be remembered by the workmen, and that the information received through this journal will be worth many times the sum expended.

A GAS EXPLOSION.

An explosion of gas took place at the store of Messrs Lee, Bliss & Co., 314 Broadway, in this city, in the afternoon of January 17th, which may serve as a warning to people in dealing with leakages of gas. For a day or two previous a smell of gas had been noticed in the basement, and it appeared to come from the front wall. A gas fitter was sent for, and he cut through the masonry around the pipe by which gas was introduced into the building. He then directed an assistant to light a match, and try the pipe at a joint within the wall to see if the leak was at that point. On the application of the match, there was a violent explosion which threw the laths and plastering from the wall, and created a commotion throughout the neighborhood.

Illuminating gas, when unmixed with air or oxygen, is no more explosive than iron or dirt. A flaming torch might be thrust into one of the large receivers at the city gas works with perfect impunity; it would be extinguished as quickly as if it were immersed in water. The gas is combustible, but no combustible will burn unless brought into contact with oxygen. Burning is the combination of fuel with oxygen, and the presence of the oxygen is just as important as that of the fuel. When a jet of gas is burned the combustion goes on only at the outer surface of the volume of escaping gas, where the oxygen of the atmosphere can come in contact with it. Professor Doremus, at one of his lectures this winter at the Cooper Institute, showed that there is no fire in the middle of a gas jet, by introducing a thimble full of gunpowder into the centre of the flame and holding it there several seconds without burning it.

But if illuminating gas is mixed throughout with atmospheric air, and a spark is applied to it, the whole mass burns instantaneously, producing an explosion. The products of combustion are water and carbonic acid, and both are raised to a high temperature by the heat generated by the combustion. This elevation of the temperature causes great expansion of the volume, which may burst open the rooms or vessels in which the gas is confined.

In all cases of the explosion of illuminating gas it will be found that the gas had previously become mingled with atmospheric air. This almost necessarily occurs when gas leaks in a confined room. The proper precaution to be adopted is the thorough ventilation of the room before a light or flame is brought into it.

ADULTERATING LARD WITH WATER.

Lard is now worth from 20 to 24½ cts. per pound, and this high price is stimulating the practice of adulterations. We learn that the old plan of mixing water with lard is being extensively practiced. By pouring water into the lard and keeping it constantly agitated till it cools, some 20 or 25 per cent of water can be mixed with the lard.

Of all substances there is none in which adulterations can be more easily detected than in lard. It is only necessary to melt it at a temperature of 212°; if it melts without ebullition or bubbling it contains no water; and if it deposits no sediment it is probably pure. Sometimes lard is adulterated with starch; this may be detected by the addition of a solution of iodine, which will turn the starch first violet and then black.

Water is used to increase the weight of butter as well as that of lard. By making the butter very salt its capacity for containing water is greatly increased. Hassall examined 48 samples of London butter and found water in all of them. The salt butters contained from 8.48 to 28.60 per cent of water, and the fresh butters from 4.18 to 15.43 per cent. The salt in the salt butters ranged from 1.53 to 8.24 per cent, and in the fresh butters from 0.30 to 2.91 per cent. The butter in the several samples was from 67.72 to 96.93 per cent, showing a proportion of combined salt and water from 3.07 to 32.28 per cent.

BEAM ENGINES.

The tenacity with which mankind cling to their opinions is proverbial. The prejudices of English Engineers against beam engines is remarkable. A late writer in the *London Mechanics' Magazine*, in an article on the Steam Engine says:—

"The beam engine is undoubtedly the most practical for slow motion, hence its universal adoption for pumping and blowing. The valves of these engines when of a large size, or above fifty horse power, nominal, are generally of the double beat kind. This valve is not perfect in its action, as practice proves that the expansion of the valves and the casing are unequal. The position of, or distance between, the seatings is not even, or the same when heated as when cool. It should be a rule to grind the double beat valve in its seats when hot, the top and bottom diameters being unequal, that is, the latter sufficiently small to pass through the former. In small valves this is not of much practical importance, but in those of the large kind, the evil is painfully perceptible. The defect is seen and felt in the opening and closing. The steam, acting on the top or larger surface, has more power over it when the valve is stationary than when in motion. The area of the opening in the center part should equal half the top seat."

Beam Engines for slow motion, indeed! The fastest steamers we have afloat and the quickest working engines in factories are beam engines, and when we want a high piston velocity we put up a beam engine because we get more "turns" out of them than any other kind for paddle vessels. The *Stockton*, a passenger boat between this city and Philadelphia, makes regularly 650 and 700 feet per minute piston speed; she has a beam engine rising 50 inches diameter and 12 feet stroke. The *Jesse Hoyt*, another fast bay steamer, 480 tuns burden, has a beam engine 48 inch cylinder and 12 feet stroke, and makes regularly on an average 576 feet per minute, burning 12 tuns of coal per 24 hours in so doing. The average boiler pressure is 30 pounds, and the trips are intermittent, or short, only 22 miles in length. Several are made in a day, and the average time for this distance is 65 and 70 minutes; it has been made in one hour with ease. The steam is worked expansively, cutting off at 8 feet, or three-fourths of the stroke; formerly the influx was stopped at one-fourth the stroke, but by altering the cut so as to follow 8 feet, 15 minutes better time was made, while the coal consumed was only one-half a tun greater.

It should be stated that the fires are kept banked

all night on the fuel mentioned, and that the net consumption for 24 hours is 12 tuns.

The trouble in regard to double beat valves is overstated. Such difficulties formerly existed, but are measurably overcome. Of course if the metals composing the valves and chest are alike the expansion will be the same. For running in fresh water the valves and chest are generally made of cast iron, for little or no corrosion takes place; but for marine engines the case is different, and brass must be used for the valves and seats. It was formerly customary to use *disks* wholly of brass for the valves, which were bolted to columns in form like spools. This practice is now obsolete in the best shops, and the "spool" is very greatly enlarged, so that it is nearly the size of the valve itself.

In an 18 or 20 inch poppet valve, for we have some of this size, the brass seat is not more than an inch thick in the average, considered through the diameter of the valve. The difference in the rates of expansion is therefore very little. It may be here remarked that most of the complaints from poppet valves arise from defective workmanship. Most engineers and lathemen fancy it is an easy thing to make a pair of poppet valves, whereas there is no detail that requires nicer adjustment and closer attention. In shops where beam engines are built one man is kept on this work continually, and he soon acquires great proficiency in it.

Where the valves are taken apart in order to get them out of the chest, the exhaust valve for instance, it very often happens that the engineer is at fault and not the valves; for it is an easy matter to throw one of the disks out of line with the other by screwing up the bolts unequally, or allowing dust or dirt to fill in.

The writer quoted at the commencement of this article says in relation to beams:—

"Beams of cast iron are generally adopted for two reasons: first, simplicity of manufacture, and secondly, symmetry and cost, all of which are certainly matters of great consideration to the contractor. The chief object to be sought after in the manufacture of cast iron beams is an even diffusion of the material, so that, in cooling, the fiber of the metal can contract equally. In order to maintain lightness combined with strength, in large engines beams are in halves or sides, connected by distance pins. It is a rare occurrence for beams so constructed to fracture. The gudgeon bosses of cast iron beams would, if embraced with wrought iron bands shrunk on, be greatly strengthened. Beams of wrought iron plates and angle iron are coming much into use; but the cost is the greatest barrier to their general adoption. The presumed unsightly appearance of the rivet heads, angle iron, and laps of plates—each of these eyesores—is soon healed by the conviction that safety is guaranteed."

Beams to our engines are known as skeleton beams. The form is that of a diamond; the breadth being equal to half the length. The strap is wrought iron, and the center or skeleton cast. The two parts are firmly keyed together. Accidents have happened from breaking the strap; when this occurs a general smash up is the result. Ten years ago these occurrences were frequent, but they are now rare, for the dimensions of the straps have been much increased.

Ideas vary with localities. Our engineers think there is nothing more uncouth and lubberly than the solid cast iron beam, and they are termed by the irreverent "grate bars," from a remote resemblance to that useful appendage to a boiler. The cost of construction is certainly in favor of the solid beam; it has no advantage in weight, is unquestionably weaker, weight for weight, than the composite beam, and in point of appearance there is no comparison. The Stevens beam was complete from the hands of its designer and no material improvement has been made in our day.

A Mechanical Problem.

Make two broad-faced wheels of precisely the same size, weight and form. Let them be composed of wood and iron, but have the iron in one disposed around the perephery, and in the other at the center. Allow the wheels to start together and roll down an inclined plane; what will be their relative velocities? If on coming to the bottom of the plane they roll along a level floor or track, what will be their relative movements throughout their course?

PROFESSOR GROVE ON LIGHT.

In our last number we made a brief statement of Professor Grove's views of heat, as set forth in his treatise on the Correlation of Forces. The principal point of difference between him and some other writers on this subject, is in relation to the nature of the all-pervading ethereal fluid which *fills* the vast spaces between the planets and the stars, and which by its undulations, vibrations, or motions, conveys the forces of light and heat across these spaces. In his chapter on light, Professor Grove sets forth his views of this fluid more fully, and it seems that the point on which he insists is, that it is ponderable, or subject to the attraction of gravitation. He argues the point at great length, but the following paragraphs contain the substance of his conclusions:

"An objection to which the view I have been advocating is open, and a formidable one, is, the necessity involved in it of an universal plenum; for if light, heat, electricity, &c., be affections of ordinary matter, then matter must be supposed to be everywhere where these phenomena are apparent, and consequently there can be no vacuum.

"These forces are transmitted through what are called vacua, or through the interplanetary spaces, where matter, if it exist, must be in a highly attenuated state."

"The difference between the view which I am advocating and that of the ethereal theory as generally enunciated is, that the matter which in the interplanetary spaces serves as the means of transmitting by its undulations light and heat, I should regard as possessing the qualities of ordinary, or as it has sometimes been called gross, matter, and particularly weight; though, from its extreme rarefaction, it would manifest these properties in an indefinitely small degree; whilst, on the surface of the earth, that matter attains a density cognizable by our means of experiment, and the dense matter is itself, in great part, the conveyer of the undulations in which these agents consist. Doubtless, in very many of the forms which matter assumes, it is porous, and pervaded by more volatile essences, which may differ as much in kind as matter does. In these cases a composite medium, such as that indicated by Dr. Young, would result; but even on such a supposition, the denser matter would probably exercise the more important influence on the undulations. Returning to the somewhat strained hypothesis, that the particles of dense matter in a so-called solid are as distant as the stars in heaven, still a certain depth or thickness of such solid would present at every point of space a particle or rock in the successive progress of a wave, which particles, to carry on the movement, must vibrate in unison with it.

"At the utmost, our assumption, on the one hand, is, that wherever light, heat, &c., exist, ordinary matter exists, though it may be so attenuated that we can not recognize it by the tests of other forces, such as gravitation, and that to the expansibility of matter no limit can be assigned. On the other hand, a specific matter without weight must be assumed, of the existence of which there is no evidence, but in the phenomena for the explanation of which its existence is supposed."

PAPER FROM CANE.

Our old subscribers will remember that a good deal was said a few years ago about Lyman's process of preparing wood fiber for paper making. A long cannon was fitted with a steam-tight valve over the muzzle, the valve swinging on hinges and being closed with a latch. The cannon was filled with logs or sticks of wood, and steam was forced in under a very high pressure till all the pores of the wood were filled with it. The latch was then struck up, when the valve flew open, and the wood was shot out by the force of the steam. The pressure of the steam being removed from the outside of the wood, that within the pores expanded, and split the wood to shivers. The labor of cutting and trimming the sticks to prepare them for entering the cannon prevented the process from being economical, but it was thought that the cane of the southern cane brakes, being straight and free from limbs, might be worked with advantage. The following letter gives the result of the trial with cane.

Messrs. Editors:—My father, believing that in the great cane brakes of the south-west there was an inexhaustible source of supply for paper—provided the cane could be disintegrated, and the fibrous portions of the plant so cleaned as to leave it a pure cellulin, without too great an expenditure of fuel or chemicals—about three years since turned his attention to that subject. He thought that Lyman's steam explosive process was a step in the right direction for the preparation of the material for chemical treatment.

With this belief he leased of the owners of Lyman's patent the exclusive right to its use in the western and south-western states. To fully test its value—previous to erecting more extensive works—we had two of the Lyman disintegrating *guns made* at the Novelty works, New York, and put them in operation at this place in July, 1863. We continued to operate with them on cane until reluctantly convinced that the process was not only extravagantly wasteful of fuel, but dangerous to operate, and uncertain in results; 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. We did not abandon the use of the guns on hasty trial, but used them until we had expended many tons of coal and cane, keeping account of the cost. We then threw them out as utterly worthless in a commercial point of view; we, however, never *abandoned* the hopes of so freeing cane fiber as to make a good quality of paper.

My father went through an elaborate and analytical series of experiments which have resulted in perfect success. We are regularly producing paper like the enclosed which is three-fifths cane.

The process of disintegration and cleansing is effected without the use of alkali or any other chemicals, but by a system of sap volatilization which by active passing steam prepares the cane for any simple and cheap mechanical treatment which is certain in its results.

The steam that is used in volatilizing the sap and cementing principle of the plant is utilized in heating wash-water and the condensed steam is evaporated leaving a residue resembling burnt sugar (caromel), but more *bitter*, which when used for coloring liquors gives to them a delightful aroma; but we are now preparing to use it for a more utilitarian purpose.

By my father's process there is little of the plant wasted. By a simple machine of his invention we strip the leaves from the cane, which, when cured, make a most excellent food for cattle; our stock are kept on it and eat it with a relish. The non-fibrous portions of the plant are separated by washing and are also utilized. F. H. Sellers.

Sellers' Landing, Hardin Co., Ill.

[The sample sent us is a very fair article of wrapping paper, smooth and strong enough for most purposes for which wrapping paper is employed.—Eds.

SPECIAL NOTICE.

Silas S. Putnam, of Dorchester, Mass., has petitioned for the extension of a patent granted to him on April 15, 1851, for an improvement in window-curtain fixtures.

It is ordered that the said petition be heard at the Patent Office, Washington, on Monday, March 27, 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.

Vehicle for Medicine.—According to the *Chemical Gazette*, wafer paper is much used in France as a vehicle for powders. It may be made by heating two common smoothing irons and touching their surfaces with butter, and then pouring on one of them a small quantity of thin paste, made of rice or wheat flour, the other iron being instantly applied so as to press the water between the two faces and cook it sufficiently. The iron must not be hot enough to scorch it. In using the wafer cut it of the proper size and dip it in water; place the powder on it and wrap or roll it up. It is said to go down like an oyster.

Bones are brittle in cold weather; a slight misstep may cripple a person for life.

RECENT AMERICAN PATENT.

Improvement in Combs.—This invention consists in the application to combs of a metallic back, graduated as a ruler, and so applying it to the comb or comb teeth that the same may be removed on being broken or damaged, and a new comb or set of teeth easily and quickly inserted in place thereof. We have seen a neat little pocket or moustache comb made according to this invention. The comb part shuts into a case, and when it is opened the back of the case and of the comb constitute the ruler, which is graduated as minutely as could be desired; it occupies no more room than an ordinary comb for the same purpose, and, the advantage of always having a ruler in one's pocket is apparent. Its application to long combs is also apparent, for one usually knows where to find his comb and brush, and this invention enables him to find in the same place a rule intended for both ruling and measuring, thus avoiding ofttimes considerable search. The comb or teeth being removable enables the back or ruler part to be used over and over again, and it is contended that combs of this character will be sold as cheaply as ordinary bone combs. This invention is due to Dr. G. F. J. Colburn, of Newark, N. J.

One Horse Mowers Wanted.

A correspondent of an agricultural paper discourses upon the disadvantages which farmers labor under in not having mowing machines which run with small power. He says:—

"Will you or some of your mowing machine correspondents, tell me why there are no real one-horse mowers made and in the market? I am aware that there are machines called one-horse mowers, and I have known several being bought and tried with one horse, but invariably condemned because requiring more than the power of one horse to operate it. What is the difficulty? Simply this—so far as I have examined the machines, they are in all respects, including size, weight and shape, two-horse machines, except the use of thills instead of a pole, and a cutter-bar about three instead of four feet long. Being a one-horse farmer myself, so far as I am farmer at all, I want a mower that one horse will manage as easily as two horses usually do the two-horse machines, which is surely hard work enough for any horse. There are very many one-horse farmers in New England who rake and draw their hay with their one horse, and would be very glad to mow it with the same horse; very many also, like myself, have not physical health and strength to swing a scythe, but would be able to drive a mower, as they do the rake and hay cart. We use a one-horse team wagon half the weight and capacity of a two-horse wagon; a one-horse sled, plow, harrow, cultivator, roller, &c., each half the weight, strength, size, capacity, &c., of the ordinary two-horse implements, and in our "one-horse" circumstances we think we do so to advantage. Being somewhat of a mechanic myself, I have no doubt that it is practicable to build a mowing machine, properly proportioned throughout, that may be operated as easily with one horse as the other machines are now worked with two similarly sized horses, and do one-half the amount of work per hour—provided a boy of one-half the weight of a man rides upon it. I come to this conclusion after hearing the objections of several manufacturers, nearly all of which seem to resolve themselves into this, that "new patterns throughout would need to be made," which is of course true; but I think the demand for the machines would "make it pay."

Preserving Flowers by Glycerine.

Mr. C. R. Tichborne states, in the London *Artizan*, that, being desirous of preserving a vegetable *lusus naturæ* for some time, he submerged it in some weak glycerine, considering that that fluid would be less likely to destroy the tender organism, and also remembering that it had been found most efficient in the preservation of animal tissues. The glycerine answered its purpose most admirably, preserving the delicate parts of the plant and preventing decomposition. He immediately saw that the property of glycerine might be made available for certain pharmaceutical purposes, where it was desired to preserve or extract the aromata of vegetable products, such as elder, orange, or rose flowers, and also might be substituted for the oils and fats used in the purest process termed enfleurage. The glycerine need not be especially pure, but should be devoid of odor. The elder-flowers should be gathered when the corolla is fully expanded, but not too far gone; they should then be plucked from the stem, and packed firmly in wide mouthed bottles or jars, without crushing them; and the whole should then be covered with glycerine. Mr. Tichborne states that he has thus preserved flowers for two years, and, on distilling them, procured a water the perfume of which has equalled the most recent product. For the preservation of the aroma of the flowers he considers the employment of glycerine far superior to the system termed enfleurage, in which heat is used.

Our thanks are due to H. Kilbourne, Esq., the efficient Chief Clerk of the Department of the Interior, also to Hon, D. Morris, Hon. James Brooks, Hon. Geo. H. Yeaman, Hon. E. C. Ingersoll, and to Senator Morgan, for public documents.



ISSUED FROM THE UNITED STATES PATENT-OFFICE

FOR THE WEEK ENDING JANUARY 17, 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.

45,902.—Method of Preventing Oil Barrels from Leaking.—David Ahl, M.D., Newville, Pa.:

I claim the composition, as herein specified, for the purposes herein substantially set forth.

45,903.—Harrow and Seeder.—D. L. and John M. Barlow, Cohoctah, Mich.:

We claim, first, The harrow, n, constructed and operated substantially as herein described.

Second, The harrow, n, in combination with the seeder, B, the whole constructed and operated substantially as and for the purpose herein set forth.

45,904.—Oyster Dredge.—Wm. Belbin, Baltimore, Md.:

I claim the combination, in an oyster dredger, of the rake bar, A, front rods, C, and rear rods, D, with the head, E, and swiveling link, F, when the rods, C, are curved, constructed and arranged as and for the purposes described.

45,905.—Harvester.—Jacob W. Bope, St. Louis, Mo.:

I claim the adjustable sliding platform or dropper hinged at or near its rear edge, as described, so that by the raising of the front edge, it performs the two-fold function of the dropping gavel, and at the same time operating as a perfect cut-off to arrest the falling grain.

45,906.—Harvester.—Jacob W. Bope, St. Louis, Mo.:

I claim, first, Hinging the grain platform, which is arranged directly behind the cutting apparatus, at or near its center, substantially as described, so that it will vibrate upon a fixed point, and by the elevation of its front edge, perform the double function of discharging the completed gavel, and simultaneously therewith arresting, upon its front edge, the fall of the accumulating grain, as described.

Second, I claim operating the tilting platform, A, by means of the lever, D, with the chain or cord, C, in the manner as and for the purposes herein described.

Third, I claim the adjustable shield or guard, E, arranged and operating in connection with the grain platform, as herein described, for the purposes set forth.

45,907.—Whitewash Brush.—W. B. Burtnett, New York City, and James P. McIntosh, Brooklyn, N. Y.:

First, We claim a brush block in combination with a slotted way, E, substantially as described.

Second, We claim a slotted way, E, in combination with a ferrule, C, substantially as described.

Third, We claim a brush with its handle applied thereto when the several parts are constructed and operated substantially as described.

45,908.—Gas or other Retorts.—John Chilcott, Brooklyn, N. Y.:

I claim, first, Surrounding the bottom, sides and top of a gas or other retort, with a jacket or casing, C, between which and the retort a continuous system of flues, E E, is formed by means of longitudinal partitions, having openings at opposite ends alternately, whereby the flame is caused to circulate back and forth several times along, and once all around the retort, substantially as and for the purpose herein specified.

Second, The jacket or casing, C, divided longitudinally into two parts and having the flue partitions attached to its interior so as to be detachable from the retort, substantially as and for the purpose herein specified.

45,909.—Comb.—G. F. J. Colburn, Newark, N. J.:

I claim a comb having graduations or a rule arranged therewith, substantially as described.

45,910.—Oscillating Valve.—Guy Davis, Syracuse, N.Y.:

I claim the conical suspended valve, I, with its openings, J J, communicating with the steam chest and the induction openings, K K, and eduction opening, T, communicating with the cylinder, substantially as described.

45,911.—Portable Forge.—John H. Dickerson, Cincinnati, Ohio:

I claim, first, The combination of the pan, A', hinged plate, Y, bolts, W W, and catch, X, constructed and employed as herein specified, to constitute a forge bed and screen while in use, and a close and secure tool box in traveling.

Second, The hinged frame, G, and brace rods, L L, employed to support the bellows, while in use, and adapted to be compactly folded for transportation.

Third, I claim the combination of the pan, A', screen, Y, bellows, E C, stand, G, lever, J, and braces, L, all constructed and arranged substantially as and for the purposes set forth.

45,912.—Cartridge Retractor for Many-chambered Fire-arms.—W. C. Dodge, Washington, D. C.:

I claim, first, the ejection, simultaneously, of two or more cartridge cases from a many-chambered fire arm, in the manner and by the means substantially as herein set forth, whether the chambers be stationary or revolving, and whether loaded at the front or rear.

Second, I claim the retractor, a, provided with the stem, b, and spring, c, or their equivalents, in combination with the cylinder or barrels of a many-chambered fire-arm.

Third, I claim providing the retractor, a, with a stem which is made to extend through the cylinder or barrels, and project at either the front or rear end thereof, for the purpose of being operated, as shown and described.

45,913.—Revolving Flood Gate.—John Du Bois, of Williamsport, Pa.:

I claim, first, A centrally balanced revolving flood gate, constructed and operating substantially as herein described.

Second, Supporting the gate, C, in its bearings in such manner that it shall be allowed to rise bodily in the act of opening to allow the water to escape, and using the arms, c c, or equivalent means for holding the gate down and preventing it from turning, substantially as described.

Third, The abutment, b, on the floor of the chute, when used in conjunction with a revolving flood gate, operating substantially as described.

Fourth, A revolving flood gate, which is so arranged and constructed that it will be opened by the water in the basin rising above a certain determined level, substantially as described.

45,914.—Method of Removing Incrustation from Boilers.—Davis Embree, Dayton, Ohio:

I claim the use of still slops to prevent or remove incrustation by lime in steam boilers, and the use of quicklime, in the manner herein substantially set forth, to prevent such incrustation.

45,915.—Manufacture of Illuminating Gas.—William Elmer, New York City. Patented in France Dec. 5, 1864:

I claim the process of manufacturing gas by distilling the gas stock in one retort and converting the volatile product of the distillation and illuminating gas in another retort in the presence of a material which, when at a high temperature, will absorb and fix the oxygen contained in the volatile product of the distillation, the process being conducted substantially as set forth.

I also claim the process of manufacturing illuminating gas by distilling the gas stock in one retort and converting the volatile product of the distillation into illuminating gas in another retort in the presence of an additional quantity of steam to that obtained from the gas stock, and of a material which will absorb and fix the oxygen contained in the volatile product of the distillation and in the additional steam, the process being conducted substantially as set forth

45,916.—Smoking Pipe.—Frederick Fickey, Jr., Baltimore, Md.:

I claim the use of the metallic cup, B, in combination with the absorbent bowl of a tobacco pipe, substantially in the manner and for the purpose set forth.

45,917.—Coal-mining Machine.—John S. Fisk, of Meadville, Pa., and James Westerman, of Sharon, Pa.:

We claim the combination in a coal-mining engine of one or more circular saws on a single mandrel, with an adjustable feeding mechanism, arranged on a moving truck, substantially in the manner described and for the purpose set forth.

45,918.—Mode of Ventilating Mines.—John S. Fisk, of Meadville, Pa., and James Westerman, of Sharon, Pa.:

First, We claim the combination with a forcing pump or engine, located at or near the mouth of the mine, of one or more reservoirs for compressed air located within the mine, at a distance from the engine and near the working point, substantially in the manner herein described, for the purpose of ventilating the mine, and of exerting a uniform pressure as a motor, as set forth.

Second, The combination of one or more reservoirs, arranged substantially as herein described, with a large induction and small eduction pipe and stop valves, as and for the purpose set forth.

45,919.—Magazine or Self-loading Fire-arms.—Walter Fitzgerald, of Boston, Mass.:

I claim the breech block, D, and guard lever, E, so connected by the pins, c d, and slots, b u, that the vibration of the lever, E, will give the breech block the required motions in its passage within the breech, C, substantially in the manner and for the purposes specified.

Second, I claim, in combination with the breech block, D, the cartridge guide, F, and cartridge discharger, H, when constructed and arranged to operate together with a magazine, substantially as herein described and represented.

Third, I claim the percussion rod, G, constructed and operated substantially in the manner and for the purpose set forth.

Fourth, I claim locking the magazine, substantially in the manner set forth.

45,920.—Horse Rakes.—David D. Gitt, of Arendtsville, Pa.:

I claim the employment, in combination with any part of the rake, which, for the purpose of discharging the rake, is moved, or movable, of a weight, under the arrangement herein described, so that while the center of gravity of the lifting apparatus is back of the fulcrum, it shall, on the rake being operated for discharge, be displaced and thrown forward in the manner herein described.

Second, Combining with the teeth made of wire or other material, hinged to or hung upon a fulcrum bar, a spring staple, under the arrangement herein described, so as to bear with yielding pressure on the teeth.

45,921.—Horse Powers.—Samuel B. Haines, of Lancaster, Pa.:

First, I claim the vibrating yokes, H, in combination with the levers, D, and the conical pivot, L, substantially as set forth.

Second, I also claim the hollow conical pivot, L, when cast in one piece with the head plate, K, extending so as to fix the gearing at the circumference of the main wheel, A, substantially as specified.

45,922.—Artificial Fuel.—William Halsted, of Trenton, N. J.:

I claim the combination and mixture of the ingredients, in the manner and proportions above described.

45,923.—Seed Sower.—J. M. Harshbarger, of Brandonville, West Va.:

I claim a seed slide, in two or more sections, adapted to be connected and disconnected by the employment of a link, c, or its equivalent, substantially as and for the purpose herein described.

45,924.—Corn Sheller.—Daniel Hutchinson, of Fort Ancient, Ohio:

I claim the disks, C and D, and the breast, b, when combined and arranged relatively to each other, in the manner and for the purpose specified.

45,925.—Straw Cutter.—John C. Kenedy, of Logansport, Ind.:

I claim, first, The described arrangement of the diamond or angular-shaped sliding sash or frame, D D D, horizontal knives, b b, when constructed and arranged, substantially as described and for the purposes set forth.

Second, I claim the inclined knives, a A, when constructed and operated by the rod, F, and lever, E, substantially as and for the purposes set forth in the specification.

45,926.—Sod Cutter.—Wm. A. L. Kirk, of Hamilton, Ohio:

I claim, first, The arrangement of frame, A, rollers, B and C, and rod-cutting blade, E e e' e'', substantially as set forth.

Second, The parts, A B C D D' E e e' e'' F G K and L, as herein arranged and combined.

45,927.—Bumper Spring.—Robert Levington, of Monroe, Mich.:

I claim the protector, K, and the yoke, J, in combination therewith, as is clearly set forth and described.

45,928.—Forging Apparatus.—Edward F. McFarland, of Worcester, Mass.:

I claim, first, Constructing the stem, D', of a hammer, D, of a spring, which is attached at its upper end to a crank shaft, a, substantially as described.

Second, The combination of a hammer, D, spring stem, D', crank shaft, a, and lever, E, operating substantially as described.
Third, The use of shelves, g g, adapted to support the hammer, D, when not in use, substantially as described.
Fourth, The application of a counter weight, h, which is suspended by a spring, k, to a hammer, or its equivalent, which is also suspended by a spring stem, substantially as described.

45,929.—Side-hill Plow.—Elijah McKesson, of Phillips Mills, Pa.:

I claim, first, The double mold board, having a triangular front, corners to lock in the groove of the land side, and a pointed projecting termination, constructed, arranged and operating substantially as and for the purposes set forth.
Second, The combination of the shoes, 1 and 2, with the mold board and land side and share, when constructed, arranged and operating, substantially as described.

45,930.—Detachable Flat Top and Elevated Cooking Stove.—John McKnight, of Philadelphia, Pa.:

I claim, first, So constructing a cooking stove in two sections that it can be converted from a flat-top stove to an elevated oven stove, or vice versa, substantially in the manner and for the purpose herein set forth.
Second, The hollow projection, a', at the rear of the ash pit and below the fire grate, the said projection communicating with the flue, G, as and for the purpose specified.
Third, The detachable hollow casing, H, forming a communication between the ash pit, B, and flue, G, as and for the purpose set forth.

45,931.—Wrenches.—George Meader, of Ottawa, Ill.:

I claim as a new article of manufacture the adjustable wrench, constructed and operated as herein described.

45,932.—Carpenter's Gages.—George Miller, of Washington, D. C.:

I claim a gage, constructed substantially as described and for the purpose specified.

45,933.—Fire Chamber Clearer.—Geo. Rodney Moore, of Lyons, Iowa:

I claim the attachment of the plate or clamp, C, or its equivalent, to the grate, E, substantially in the manner and for the purpose set forth.

45,934.—Cultivators.—Elias C. Patterson, of Chicago, Ill.:

I claim, first, The curved levers, A B C D, constructed and operating substantially as described.
Second, The combination of the curved and straight levers, constructed and operating substantially as described.
Third, The combination of the curved and straight levers with the plows, constructed and operating substantially as described.
Fourth, The peculiar form and arrangement of the middle-rear plows, all constructed and operating substantially as described.

45,935.—Artificial Fuel.—F. C. Payne, New York City:

I claim, first, A fuel composed of a conglomerate of coal screenings, or small particles of coal, and hydraulic lime, substantially as herein described.
Second, The use of plaster of Paris with hydraulic lime, substantially as herein described, in cementing together coal screenings, or small particles of coal, to render the latter serviceable as fuel.

45,936.—Laths for Buildings.—Dewey Phillips, Shaftsbury, Vt.:

I claim tongued and grooved laths, formed with grooves in their surfaces, receiving the mortar, substantially as specified.

45,937.—Floor Covering.—Anson H. Pratt, Yellow Springs, Ohio:

I claim the application and use of figured or ornamented paper, printed with water colors, to floors, as a substitute for oil cloth and carpets, as herein described, whether stationary or movable.

45,938.—Mangle.—William Price, Cincinnati, Ohio:

I claim encasing the working parts of a mangle, the case being so constructed and hinged as to let down and form the support for guiding the articles in a line between the pressing rollers and fold up, and close together so as to protect the working parts when not in use, substantially as herein specified.

45,939.—Car Coupling.—Martin Rinehart, Monroe, Mich.:

I claim the combination of the sliding block, A, apron, B, with the hook, C, and link, d, substantially as described and for the purpose set forth.

45,940.—Washing Machine.—George W. Sayre, Pisgah, Ohio:

I claim the combination of the adjustable oscillating frame, K provided with cranks, pitmen, pendants, and beaters; with the adjustable weight, L, and scroll bottom, B, arranged and operating in the manner and for the purpose substantially as described.

45,941.—Condenser.—John M. Spiegle, Philadelphia, Pa.:

I claim the use, in connection with the air pump, of a condensing steam engine, of the perforated tubes, d and e, or their equivalents for introducing jets or streams of air into the water as it passes from the air pump to the hot well, as set forth.

45,942.—Horse Rake.—A. B. Sprout, Hughesville, Pa.:

I claim, first, Making a curved rake tooth, of a triangular sectional shape, (or its equivalent, semi-eliptical or semi-circular) and so applied that the flat side shall be on the inner side of the curve to endure the tensional strain, while the rear salient edge shall act as a stiffener to the tooth.
Second, I claim the combination of a tooth of a triangular sectional shape (or its equivalent, semi-eliptical or semi-circular) and with a flat side on the inside of the curve of the tooth, with a coiled spring by which it is attached to the head, and by means of which its elasticity is increased.
Third, I claim the plates, C c, adapted to be secured in position by the screw, c', substantially and for the purpose specified.
Fourth, I claim the spool, C2, c2, c3, constructed and arranged substantially as described, and adapted for the attachment of the spring, A, in the manner set forth.

45,943.—Piano Fortes.—Maurice Vergnes, New York City. Ante-dated Jan. 2, 1865:

I claim, first, The application to a clavichord instrument of a mechanism to operate a hammer upon a drum in the manner substantially as above described.
Second, The use of the slide, H, and the curb straps to hold the hammer in the condition to produce the roll of the drum, in the manner substantially as above described.

45,944.—Apparatus for Amalgamating Metals.—Owen G. Warren, New York City.:

I claim, first, Pouring quicksilver down through a sieve or strainer into a mass of comminuted ores and water, which has been subjected to a cooking process to gather the ores contained, in the manner substantially as above described.
Second, Obtaining the metals in their successive degrees of fineness by successive leeching with quicksilver poured down through a strainer into the ores and water, and successive gatherings of the amalgam formed, in the manner substantially as above described.

45,945.—Oil Lamp.—Edward Weissenborn, Hudson City, N. J.:

I claim the sponge, C, the follower, D, screw, E, and movable winged nut, F, applied in combination with each other, and with the oil cup, and operating substantially as herein specified.

45,946.—Screw Nicking Machine.—Jason A. Bidwell (assignor to himself, H. J. Litchfield, Daniel M. Robertson, and Asaph Churchill), Boston, Mass.:

I claim, first, The jaws, E E, sliding blocks, A A', and controling spring, K, when combined with each other, and with a circular saw, I', substantially in the manner and for the purpose herein set forth.
Second, The arrangement and combination of the sliding blocks, A A', with the upright, B, slotted side levers, O O, and operating lever, M, or their equivalents, substantially in the manner and for the purpose herein set forth.

45,947.—Casting Molten Metal.—Joseph De Rosthorn Vienna, Austria, assignor to Clemens Herschel, Davenport, Iowa:

I claim the improved method of operating to increase the density and strength of metallic castings, substantially as set forth.

45,948.—Grate.—Loomis G. Marshall, Mokena, Ill.: assignor to himself and F. W. Hughes, Pottsville, Pa.:

I claim a conical or angular shaped grate, formed of bars sloping from the inside to outside, as herein described and for the purposes set forth.

45,949.—Faucet.—Robert Murray, Boston, Mass., assignor to himself and James W. Tufts, Medford, Mass.:

I claim the improved faucet having its valve shaft arranged in the prolongation of the axis of its induction tube and pivoted in or at the inner end thereof, and made with its inner journal so channeled as to enable a fluid to pass into and through it while passing from the induction tube into the valve case, the faucet being in other respects as specified.

45,950.—Material for Making Boxes, etc.—Wm. Painter, Baltimore, Md., assignor to himself and Charles Painter, Owing's Mills, Md.:

I claim as a new article of manufacture the asphaltic board, made substantially as described, for the manufacture of boxes, packages, and other articles.

45,951.—Packing for Rifled Projectiles.—Frederika Schenkl, Boston, Mass., administratrix of John P. Schenkl, deceased, assignor to self and Edward A. Dana, Brookline, Mass.:

I claim the combination of a paper mache sabot, with a metallic ring at top, and a ring and disc of metal at the base to protect it, substantially in the manner described.

45,952.—Self-loading Fire Arms.—Christopher M. Spencer (assignor to Spencer Repeating Rifle Company) Boston, Mass.:

I claim, first, The compound magazine inserted in the stock of the piece, and consisting of two metallic tubes, constructed and operating substantially in the manner described.
Second, In a double tube magazine chamfering the inner side of the forward end of the inner tube, F, in the manner and for the purpose described.
Third, The arrangement of the groove, c, and catch, h, for conjoint operation, as specified.
Fourth, The combination and arrangement of the cap, G, arm, H, recess, d, and pin, d', substantially in the manner described.
Fifth, The combination of the receiver, B, tube, D, nut, E, and stock, A, in the manner and for the purpose set forth.

45,953.—Apparatus for Winding Thread from the Skein.—James Crutchett, Stroud, Eng. Patented in England Aug. 23, 1864:

I claim, first, The combination of the sliding arms, a a a a a, figures 1, and 3, with the curved finger, d, for adjusting the apparatus to the size of the skein and the folding joint, G, for folding the same into a convenient portable form as above described.
Second, I also claim the application of the thumb screw, figure 6, with the slots, f f f f f, and the projections, g g g g g, for the purpose and in the combination above described.
Third, I claim the foregoing arrangement of the reel as illustrated in figures 1. 3, 4, 5, 6, in combination with the winding apparatus represented in figures 7, and 8, all for the purposes above described.

45,954.—Astronomical Instruments.—Charles Emmanuel, Paris, France:

I claim the astronomical instrument herein described, in which a theodolite, an equatorial and an ecliptic instrument are combined, affording the means of ascertaining immediately the position of the heavenly bodies in relation to the horizon, equator and the ecliptic substantially in the manner herein set forth.

45,955.—Steam Boiler.—Louis Emile Constant Martin, London, Eng. Patented in England April 28, 1864.:

I claim the arrangement of one or more fires substantially in the combination described, to generate the usual products of combustion, with one or more auxiliary incandescent fires, arranged on one or more refractory hearths, substantially as described, through which these usual products are carried, and which after being transformed into combustible gases pass through one or more flues into one or more chambers of combustion where these ultimate gases are ignited, and thus effect a large economy in fuel.

45,956.—Fire Bank.—Halsey H. Baker, New Market, N. J.:

I claim, first, A fire bank composed of a plate or combination of plates fitted to the fire-pot or fire-box of a stove, range or furnace to lie upon the fire substantially as herein described.
Second, Providing such a fire bank with one or more openings and valves or shutters substantially as and for the purpose herein described.
Third, The construction of such a fire bank of two or more plates hinged together in such a manner as to fold substantially as herein described for the purpose of enabling it to pass through the door of a stove or furnace.
Fourth, Providing such a fire bank with a hook or loop, i, so applied in combination with a hinge or hinges that it will fold by gravitation when suspended by said hook or loop substantially as and for the purpose herein set forth.

45,957.—Coal Oil Stove.—William B. Billings, New York City:

I claim, first, The use and adaptation of the body or sides of the stove or range, D, to serve as and perform the office of a flue or chimney over the lamp or oil holder, A, substantially as described and for the purposes set forth.
Second, The attaching of one or more air guides, cones or deflectors in the diaphragm, C, and the adjustment of the same in the stove or range, F, substantially as described and for the purposes set forth.
Third, The arrangement of the diaphragms, C, and g g, thus forming an air chamber between the oil holder and stove or range, substantially as described and for the purposes set forth.
Fourth A non-conductor of heat used a packing between the stove stove and the oil holder, arranged substantially as described and set forth.
Fifth, The insulation of the lamp or oil holder by non-contact with the heater, stove or range, substantially as described and set forth.

45,958.—Safety Brakes for Horse Powers.—Joseph C. Bird, Rising Sun, Md:

I claim in combination with the trigger or lever, D, the stop or catch which prevents it from rising beyond a given point, which would otherwise apply the brake without the parting or flying off of the belt, substantially as herein described.

45,959.—Rudder.—Thomas G. Crosby, Buffalo, N. Y., assignor to Bushnell Strong and Marjorie H. Crosby:

I claim constructing a rudder for vessels with concave sides as herein substantially set forth.

45,960.—Apparatus for Rendering Lard, &c.—Thomas Hopkins, Cincinnati, Ohio:

I claim, first, The collander C c c', formed and adapted to operate as set forth.
Second, The dipper D D,' d d,' d,'' formed and adapted to operate as set forth.
Third, In the described combination, I claim the devices F G G', g, H K, and L,' or their equivalents, for enabling a crane to be shifted from place to place.
Fourth, The grapple T U U', v, V, w, W X Y Z Z,' formed and operating substantially as set forth.

45,961.—Manufacturing Fertilizing Phosphates.—G. A. Liebig and E. K. Cooper, Baltimore, Md:

I claim the process substantially as described above, for producing a fertilizing phosphate containing soluble phosphates.

RE-ISSUES.

1852.—Mortising Machine.—Stephen S. Bartlett, Providence, R. I., and Thomas H. Dodge, Worcester, Mass., assignees of said S. S. Bartlett. Patented Sept. 21, 1861:

We claim, first, Giving the bed or table in a mortising machine two independent supports so that the upper support may be loosened to permit the bed or table being adjusted or placed in a horizontal or inclined position, while the bottom support prevents the table or bed from sliding or dropping down bodily during the operation whereby mortises can be cut perpendicular through the timber, or beveled to any angle required.
Second, So combining the bed or table in a mortising machine, with its supporting mechanism, as that said table or bed can be freely rocked back and forth by the operator upon a center or axis of motion above the support upon which it rests and turns, whereby mortises with perpendicular or inclined ends can be cut at the will of the operator substantially as and for the purposes described.
Third, The combination of the head piece, G, sliding head stock, L, and its lever adjusting fulcrum or collar, K, with lever, F, and arbor, E, substantially as and for the purposes set forth.
Fourth, The combination of the platform, B, and stand, D, with the main frame and supporting piece, f, substantially as and for the purposes set forth.
Fifth, So arranging, in a mortising machine the sliding or movable wrist or collar by which the change of motion of the arbor and chisel is obtained, as that it shall be above or higher than the platform upon which the material to be mortised rests, whereby it is comparatively free and safe from flying chips or dirt and other clogging matter.

1853.—Attachment for Tackle Blocks.—George Focht, Reading, Pa. Patented Sept. 28, 1858:

I claim so attaching a tackle block or pulley, that it may turn freely in all directions, and be retained in the proper relative positions with the rope when the strain on the rope ceases, substantially as described.
The combination of the stud piece of the pulley, with the spindle having a spiral spring around its other end, substantially as, and for the purpose described.
The combination of the stud piece of the pulley with a spindle, with plate, F, having a bell mouthed or flaring socket, as and for the purpose described.
Extending the sides or edges of the frame of the pulley over and beyond the edge of the wheel, and curling or rounding outward the edges of this frame, so as to present a smooth, rounded surface for the rope to strike against, thereby lessening the wear upon the rope substantially as described.

DESIGNS.

2,018.—Statuette.—Edward I. Kuntze, New York City.
2,019 to 2,023.—Carpet Patterns.—Elemir J. Ney (Assignor to the Lowell Manufacturing Company), Lowell, Mass. Six Cases.
2,024.—Group of Statuary.—John Rogers, New York City.

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.

BINDING.—Those of our subscribers who wish to preserve their numbers of the SCIENTIFIC AMERICAN for future reference, can have them substantially bound in heavy board sides, covered with marbled paper, and leather backs and tips, for $1.00 per volume.

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.



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.

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

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.

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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.

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.

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.

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

F. N. B., of Wis.—Your plan for obtaining power by decomposing water by frictional electricity is met by this fatal objection, the power required to turn the machine would be at least a thousand times greater than the power of the expanding gases resulting from decomposition. Decomposition by electricity is in direct proportion to the quantity of electricity, and the quantity produced by a frictional machine is extremely small, though the intensity is very great. Faraday ascertained by direct experiment that the quantity of frictional electricity required to decompose one grain of water would be that furnished by 800,000 discharges of a battery of Leyden jars, exposing 3,500 square inches of surface charged with thirty turns of a powerful electrical machine.

H. N. B., of Conn.—If you can ascertain the facts in regard to the discovery of antimony in your neighborhood, a statement of them would be very acceptable. Or you might make a readable paragraph in relation to vermiculite, explaining its curious action on the fire. We regret that our space is too limited to permit the publication of your article.

S. J. E., of Ill.—You will find the calculations you require on page 105 of our last volume. We make no charge for them, but if we did it would be nearer $20 than 20 cents.

W. M., of Pa.—Prof. Treadwell's statement is that the pipe of double length will sustain the pressure of double weight of steam from the same boiler; in other words, it will hold twice as much steam of the same density and pressure.

F. F., of Mass.—Steel is burnished, or glossed, as you express it, on fine buff wheels, that is, wheels covered with buckskin or chamois leather and charged with rouge or fine jeweller's crocus. We know of no method to put a fine blue on steel, except by the use of a sand bath.

T. J. W., of N. H.—Wire rope which is to be exposed to the weather is usually covered with asphaltum.

J. H. A., of Conn.—Gutta-percha is more costly than India-rubber. The solvents are the same for both gums, and rank about in the following order—the best being named first: bisulphide of carbon, chloroform, coal-tar naphtha, camphene, sulphuric ether, petroleum benzine, lamp oil. Lamp oil not being volatile cannot be separated from the solution, and therefore the gum can not be recovered from it. Neither of the gums is completely soluble after being vulcanized, though all of the solvents soften them.

E. G., of Kansas.—Every 33,000 pounds of water per minute falling one foot gives you one horse power. Water weighs 62½ pounds to the cubic foot. To ascertain the power of a stream, therefore, measure the area of the cross section of your stream, multiply this in feet by the velocity in feet per minute, by 62½, and by the fall in feet, then divide the product by 33,000, for the horse-power.

J. P. N., of Pa.—For an answer to your question in regard to the manufacture of paper from wood, see communication on another page. The paper on which the SCIENTIFIC AMERICAN is printed has one-third of its substance of wood. Several processes for preparing the fiber have been patented.

H. L. C., of Cal.—For bichromate of ammonia or other chemicals write to Scheiflin Brothers, of this city.

N. Q. S., of Pa.—The best method of removing earthwork depends upon the kind of earth. If it is hard clay, the plan is to cut into the hill till you have a vertical face of considerable depth, when you cut narrow channels at the base and sides, leaving a lump projecting some three feet, and this is then broken off by means of crowbars at the top. There are machines for excavating loose sand, but they would not be economical in a depth of only twelve feet.

O. H. K., of N. Y.—Enamels are properly glass—silicates of metallic oxides.

E. H. J., of R. I.—In order to prepare gun cotton for photographic uses you will do well to follow the directions given in Divine's Treatise or Fowler's Sunbeam, or any other good work upon the art.

S. G., of Conn.—Marine glue will hold the leather on your pulley. To make it, take four parts India-rubber, dissolve this in thirty-four parts coal-tar naphtha, warm, shaking it at the same time. Add to this sixty-four parts powdered shellac, which must be heated in the mixture until all are dissolved. When hot pour it all out on an iron plate in sheets, like leather. When wanted melt it in a pot like any other glue. Hilton's Insoluble Cement will also hold leather on iron, and will stand cold water but not hot. It is better to put three or four rivets in the wheel to help the cement. Leather can be fitted to valve seats by dove-tailing the seat, making the leather the width of the dovetail at the bottom, and crowding it in.

C. B., of Md.—At the great trial in Philadelphia Stevenson's turbine yielded 91 per cent of the power; this, so far as we know, is much more than has ever been yielded by an overshot wheel. Mr. Stevenson's address is, J. E. Stevenson, No. 200 Broadway, New York. You will find illustrations of his and several other turbines in back numbers of the SCIENTIFIC AMERICAN, all of which are claimed by their owners to be the best in the market. Turbines are not stopped by back water.

H. B. S., of Ohio.—In some States it is necessary for a man to have a license to sell any thing. He must conform to the State laws in regard to vending.

E. H. S., of Pa.—That petroleum is of vegetable origin is not doubted, but the mode of its formation is mysterious. There is no reason to suppose that the deposits are influenced in any way by the thickness of coal beds in their vicinity. The coal field west of the Mississippi lies between the parallels of 34° and 43° north latitude, and 14° and 20° west longitude from Washington.

W. B., of Mo.—You will find many articles on silver-plating in back numbers of this paper.

Money Received

At the Scientific American Office, on account of Patent Office business, from Wednesday, January 11, to Wednesday, January 18, 1865:—

P. W., of N. Y., $25; H. B., of N. Y., $35; J. L. K., of N. Y., $35; J. S. L., of N. Y., $25; A. R. J., of N. Y., $25; E. F., of N. Y., $25; S. O. R., of N. Y., $25; J. P., of N. Y., $25; H. B., of N. Y., $25; H. H., of N. Y., $25; R. B., of N. Y., $120; S. B. H., of Pa., $12; S. W. P., of Mass., $50; H. C. K., of N. J., $25; I. R., of N. Y., $40; J. S., of N. Y., $40; F. L., of N. Y., $20; H. S., of N. Y., $15; B. J., of N. J., $20; J. W. N., of Conn., $20; W. E. R., of N. Y., $15; J. J. G., of Ohio, $20; D. F. P., of Conn., $40; I. M. R., of N. Y., $40; E. R. W. of N. Y., $15; J. A. M., of N. Y., $20; H. C. K., of N. J., $40; T. S. S., of N. Y., $45; J. W. R., of N. Y., $40; R. S., of N. Y., $22; T. & J. R., of N. Y., $15; C. C., of N. Y., $20; H. W. W., of Pa., $20; D. W., of Pa., $20; J. W. H., of Iowa, $15; F. W. F., of N. Y., $20; O. H., of Ill., $20; E. N. P., of Wis., $22; C. L., of Ill., $30; N. S. T., of N. Y., $20; J. H. B., of N. J., $20; W. D., of Cal., $30; J. P., Jr., of N. J., $22; J. M. C., of U. S. A., $15; J. W., of N. Y., $20; J. Y., of N.Y., $20; D. H. M., of Conn., $40; G. W., of N. Y., $30; R. D., of N. Y., $40; P. C., of N. Y., $40; B. B., of Pa., $20; H. M. S., of Ohio, $20; E. B., of N. Y., $15; C. H. R., of N. Y., $20; H. H. W., of N. Y., $65; M. C. O'B., of Y. Y., $10; H. L. H., of N. Y., $10; J. H. H., of N. Y., $15; G. A., of Mich., $10; Von H. & A., of N. Y., $15; F. S. P., of N. Y., $15; R. E., of N. Y., $16; R. & H. V. F., of Ind., $35; J. K., of N. Y., $15; F. W., of Wis., $15; J. P. D., of Conn., $15; W. J. T., of N. Y., $15; F. J. C., of Pa., $16; A. D. D., of Ill., $15; H. F. B., of Mo., $30; J. G. V., of Conn., $35; O. H., of N. Y., $333; E. A. H., of Del., $30; T. W. B., of Mass., $25; H. W., of Mich., $25; F. A. S., of Mass., $10; J. H. V., of Conn., $30; J. P. E., of Ohio, $25; C. B. B., of Conn., $31; S. S. D., of Mass., $15; J. W., of N. J., $35; H. S. McK., of Pa., $25; J. L. & S. L. O., of Mass., $15; W. O. H., of N. J., $15; G. H. S. D., of N. Y., $100; S. S. S., of N. Y., $15; E. C. G., of B. C., $30; H. W. S., of Ohio, $15; S. P., of Ohio, $25; J. F., of Pa., $16; J. N. S., of Pa., $15; C. T., of Pa., $15; A. & Bros., of Conn., $16; J. S., of N. Y., $16; J. H., of N. Y., $25; P. M. R., of Cal., $15; W. Z. S., of Nevada, $25; J. H. J., of Ohio, $45; M. J., of Pa., $15; J. S. G., of Me., $15; J. L. K., of Pa., $15; J. R., of Mich., $40; H. & M., of N. J., $16; J. E., of Ill., $15; T. V., of R. I., $15; J. E. B., of Mass., $35; C. E. B., of Mass., $25; R. B. L., of Ohio, $25; E. B., of Mass., $15; D. G. H., of Mass., $15; W. C. B., of Cal., $45; L. S. S., of Mass., $216; H. K., of Pa., $25; M. & H., of Ill., $33; J. S., of N. Y., $15; A. J. P., of U. S. N., $16.

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. 11, to Wednesday, Jan. 18, 1865:—

W. W. S., of U. S. N.; P. W., of N. Y.; H. B., of N. Y.; J. L. H., of N. Y.; J. S. L., of N. Y.; A. R. J., of N. Y.; E. F., of N. Y.; S. O. K.* of N. Y.; J. P., of N. Y.; H. B., of N. Y.; H. H., of N. Y.; R. B., of N. Y.; S. B. H., of Pa.; A. S., of N. Y.; S. W. P., of Mass.; T. D. E., of N. Y.; T. S. & W., of Pa.; I. R., of N. Y.; J. S., of N. Y.; D. F. P., of Conn.; I. M. R., of N. Y.; J. W. R., of N. Y.; J. P., Jr., of N. J.; D. H. M., of Conn.; R. D., of N. Y.; P. C., of N. Y.; H. H. W., of N. Y.; G. A., of Mich.; J. W., of N. J.; S. P., of Ohio. J. P. E., of Ohio; J. G. V., of Conn; H. S. McK., of Pa.; J. H. J., of Ohio; W. Z. S., of Cal.; J. H., of N. Y.; J. H. V., of R. I.; T. W. B., of Mich.; H. W., of Mich.; S. N. H., of Del.; R. B. P., of N. J.; J. E. B., of Mass.; C. E. B., of Mass.; J. V., of R. I., S. B. H., of Pa.; H. K., of Pa.

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CLOTHING BUREAU, QUARTERMASTER GENERAL'S OFFICE, WASHINGTON, January 9, 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 25th inst., for furnishing by contract at the depot of Army Clothing and Equipage, at New York City,

Uniform Coats, Infantry, standard.
Artillery Jackets, do.
Trousers, Infantry, do.
Sack Coats, lined, do.
Sack Coats, unlined, do.
Shirts, Domestic Flannel, do.
Drawers, Canton Flannel, do.
Stockings, do.
Bootees, sewed and pegged, do.
Boots, Cavalry, sewed and pegged, do.
Blankets, India rubber, do.
Ponchas, India-rubber, do.
Knapsacks, do.
Haversacks, do.
Canteens, do.
Camp Kettles, do.
Mess Pans, do.
Axes, Felling, do.
Pick Axes, do.
Hatchets, do.
Spades, do.
Shovels, do.
Garrison Flags, do.
Tents, Hospital, do.
Tents, Shelter, 8-oz. cotton duck, do.
Great Coat Straps, do.

Further information may be had, and samples of the above articles may be seen, at the office of Army Clothing and Equipage, New York.

Bidders may state the number they propose to furnish, how soon they can commence, and the number they can deliver weekly, and will submit samples of the articles, or of the material of which they are to be made, and, when a textile fabric, at least one yard should be furnished.

Proposals must be accompanied by a guaranty, signed by at least two responsible persons, setting forth that if a contract is awarded to the party making the bid, that he or they will at once execute the contract, and give bonds for the proper fulfillment of the same.

The right is reserved to the United States to reject any part or the whole of the bids, as may be deemed for the interest of the service.

Awards will be subject to the approval of the Quartermaster-General of the Army.

Supplies must be delivered in regulation packing boxes.

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CLOTHING BUREAU, QUARTERMASTER GENERAL'S OFFICE, WASHINGTON, January 12, 1865.

ARMY SUPPLIES.—SEALED PROPOSALS WILL be received at the Office of Army Clothing and Equipage, Philadelphia, until 12 o'clock, M., on WEDNESDAY the 25th inst., for furnishing, by contract, at the Depot of Army Clothing and Equipage, Philadelphia, viz:—

Sack Coats, lined, army standard.
Sack Coats, unlined, do.
Blankets, India-rubber, for infantry, do.
Knapsacks, complete, do.
Hatchets, do.
Uniform Hats, do
Hat Cords and Tassels, do.
Camp Kettles, do.
Mess Pans, do.
Shelter Tents, do.

Each bid must be guaranteed by two responsible persons whose signatures must be appended to the guarantees, and certified to as being good and sufficient security for the amount involved, by some public functionary of the United States.

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Blank forms for proposals, embracing the terms of the guaranty required in each bid, can be had on application at this office, and none others which do not embrace this guaranty will be considered, nor will any proposal be considered which does not strictly conform to the requirements therein stated.

Bidders will state the quantity they propose to furnish, how soon they can commence, and the quantity they can deliver weekly.

The right is reserved to the United States to reject any part or the whole of the bids, as may be deemed best for the interest of the service.

Awards will be subject to the approval of the Quartermaster-General of the army.

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Effects produced by Air in its Natural and in a Rarefied State.
Table of the Expansion of Atmospheric Air by Heat.
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List of Caliber and Weights of Lead Pipe.
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For further particulars address—

MUNN & CO.,
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No. 37 Park Row, New York City.

PROPOSALS FOR ICE.

MEDICAL PURVEYOR'S OFFICE, WASHINGTON, D. C.

Sealed Proposals will be received at this Office until January 25, 1865, for furnishing ICE to the Medical Department of the Army, at the points herein designated. The Ice to be stored by the contractor in properly-constructed ice houses at each point of delivery, on or before the 15th of April next; the ice not to be receipted for until its quality, the fitness of the ice-house, and the manner in which it is packed shall have been approved by a medical officer, and payment will be made only for the amount thus actually stored and receipted for.

The proposals will be made for the quantities indicated below as required at the respective places, with the proviso that should more be needed at any time for the year's supply, it shall be furnished at the same rates and under the same conditions.

QUANTITY TO BE DELIVERED AT

Annapolis, Md., ice-house, owned by the United States.....150 tuns.
Point Lookout, Md., ice-house owned by the United States.200 tuns.
Fortress Monroe, Va., ice-house owned by the United States.280 tuns.
Portsmouth, Va., ice-house not owned by the United States.100 tuns.
Newbern, N. C., ice-house not owned by the United States..400 tuns.
Hilton Head, S. C., ice-house owned by the United States...450 tuns.
Beaufort, S. C., ice-house owned by the United States.....300 tuns.
Savannah, Ga., ice-house not owned by the United States..500 tuns.
Pensacola, Fla., ice-house not owned by the United States..100 tuns.
Mobile Bay, Ala., ice-house not owned by the United States.100 tuns.
New Orleans, La., ice-house owned by the United States....500 tuns.

Proposals will also be received for furnishing Ice, daily by weight, for the year 1865—in such quantities as may be required by the Surgeons in charge—at United States General Hospitals, at the places enumerated above, and upon the following annual estimate, in and near:—

Boston, Mass..... 10 tuns.
Portsmouth Grove, R. I..... 130 tuns.
New Haven, Conn..... 60 tuns.
New York..... 800 tuns.
Newark, N. J..... 100 tuns.
Philadelphia, Pa.....1,300 tuns.
Baltimore, Md..... 200 tuns.
Frederick, Md..... 75 tuns.
Washington, D. C.....2,500 tuns.

All additional amounts that may be required at these places until January 1, 1866, are to be furnished at the same rates.

FORM OF PROPOSAL.

The undersigned proposes to furnish —— tuns of first quality Ice, carefully packed in substantial ice-houses, at the within-named points, namely: ——, ——, ——, ——, at the following price per tun of two thousand pounds, namely: at ——, ——, ——, ——, tuns, at $—— per tun.

The Ice to be subject to the inspection, measurement and approval of a Medical Officer, or other properly-appointed inspector, before being receipted for.

Payment to be made from time to time upon duplicate bills certified to by the Medical Director.

(Signed) ——, ——.

FORM OF PROPOSAL.

The undersigned proposes to furnish daily, or otherwise, all the Ice required for the hospitals, upon approved requisitions of Surgeons in charge, at or near the within-named points, at the following price per hundred pounds, namely: —— —— —— —— $—— cents per hundred pounds.

The Ice shall be of the best quality, and subject to the approval of the Surgeon in charge, who shall receipt for the actual amount delivered at each hospital.

Payment to be made from time to time upon duplicate bills, certified to by the Medical Director.

(Signed) ——, ——.

The above form of proposals will be adhered to as closely as practicable. Other forms will be received by the Department and duly considered.

A proper guarantee that the bidder is able to fulfil the contract, certified to by the Clerk of the nearest District Court, or a United States District Attorney, must accompany the proposal, or it will be rejected.

An oath of allegiance to the United States Government must also accompany the proposal.

The contracts will be awarded to the lowest responsible party or parties, who will be duly notified by mail or otherwise that their bid is accepted, and immediately required to enter into contract under bonds to the amount of $5,000. The bonds must be properly certified, and the post-office address of principals and sureties stated upon them.

Bidders may be present in person when the proposals are opened.

The post-office address of the parties proposing must be distinctly written upon the proposal.

Proposals must be addressed to "Surgeon Charles Sutherland, U. S. Army, Medical Purveyor, Washington, D. C."

The Department reserves the right to reject any and all bids deemed unsuitable.

CHARLES SUTHERLAND,
Surgeon U. S. A. and Medical Purveyor,
Washington, D. C.

Printed forms of proposal may be had at this office. 3 3

COMSTOCK'S ROTARY SPADER.—HAVING DISposed of the right to manufacture and vend Comstock's Rotary Spader throughout the United States, except the New England and other Atlantic and Pacific States, we are now prepared to issue licenses to manufacture and vend this implement upon the basis of a license fee of ten per cent of gross sales of machines made and sold to parties who will advance in cash the following sums, to be reimbursed from said per centage:—For the New England States, $5,000; for the State of New York, $6,000; for the State of New Jersey, $3,000; for the State of Maryland, $2 000; for the State of Delaware, $1,000; for the State of California, $10,000; for the State of Oregon, $3,000; or, for the whole to one party, $25,000.

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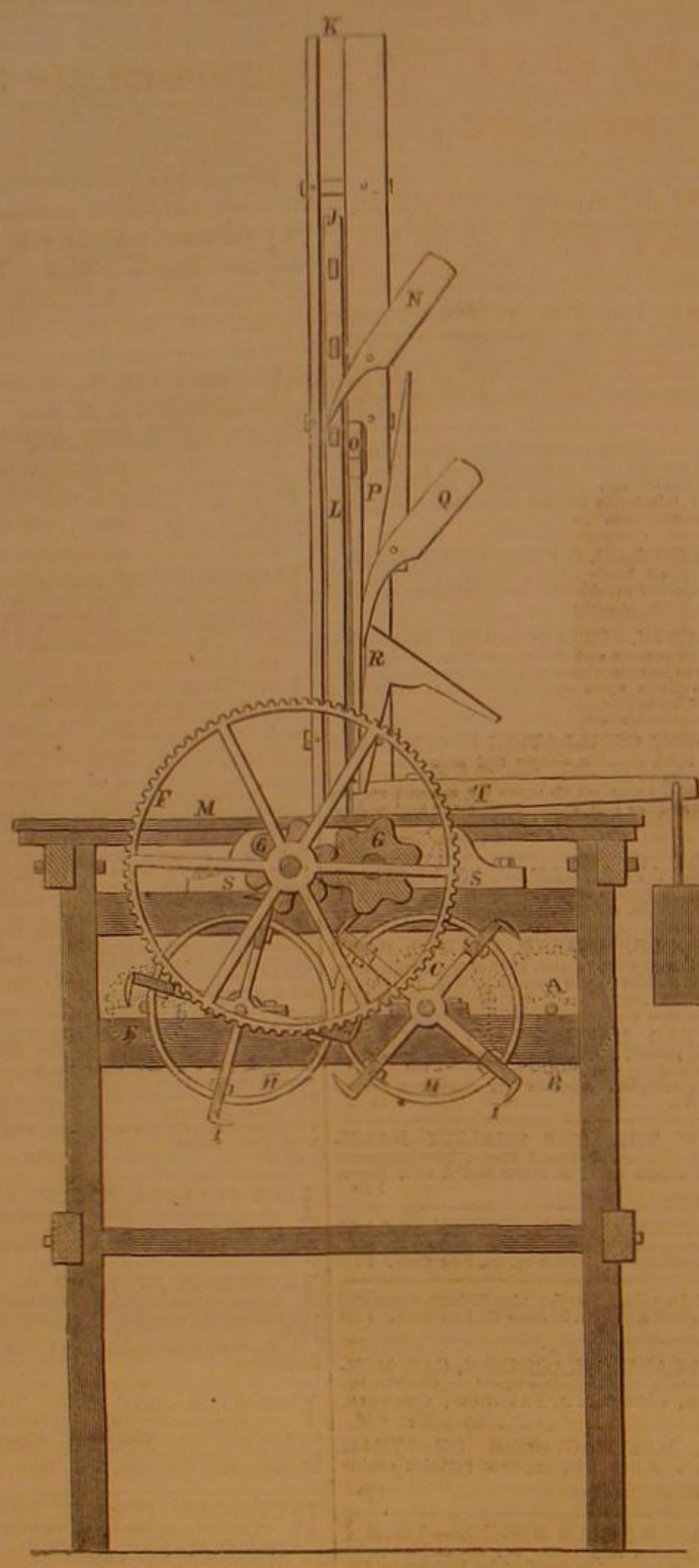
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This machine is intended to facilitate dressing hemp and flax, and is thus described by the inventor. As the manufacture of linen goods is rapidly increasing in this country, anything tending to facilitate the preparation of the material will be a valuable acquisition. The description will render the details intelligible to all:



HOWARD'S HEMP AND FLAX DRESSER.

A is a shaft to which the power is applied through two pulleys, and a gear, B, shown by a dotted circle on the frame. C is a corresponding gear attached to the end of the shaft of the dresser; it is also shown by a dotted circle. E is a cog-wheel, on the shaft of which is a friction clutch; the wheel is geared into the large wheel, F. G G are two fluted rollers, and H H are dressers made with floats, armed with hatchel teeth, I, on the edges. There is a clamp, not shown, in which the hemp is placed and laid in the top of the frame at K, resting upon the upper catch, J, on the rack, L. From thence it is drawn down to the table, M. The hemp passing between the fluted rollers is crushed and broken, and in passing down between the dressers is dressed also. The rotary motion of the rollers is then reversed by the operator with the lever attached to the friction clutch, before mentioned, carrying the clamp up to the dog, N, passing it over the top of the vibrating board, O, into the groove, P, and pressing the board to the opposite side of the rack, L. The buts of the hemp fall directly between the rollers. Their motion being again reversed, the flax is drawn down and dressed. Another reverse of the rollers carries the clamp up to the dog, Q, and throws it out over the frame R. S is a cast iron housing containing one movable box. T T is a lever and weight used to give the desired pressure upon the movable box. This invention was patented through the Scientific American Patent Agency by C. G. Howard, of Topeka, Kansas, on Sept. 6th, 1864, and assigned to C. G. Howard and E. A. Goodell. For further information address them as above.

Patent Laws in England.

The subject of protection for inventions, in the shape of patents, has been much discussed in England lately, and divers opinions have been given as to the expediency of so encouraging inventors. A royal commission, appointed by authority, have recently deliberated upon the subject in question, and have arrived at the following conclusions:—"1. That the present system of obtaining and paying for letters patent ought to be maintained, but that patent fees should not be made to contribute to the general expenditure of the State until every reasonable requirement of the Patent Office had been satisfied. 2. That the patent be granted if it be found after examination that there has been no previous documental publication of the invention; but that no investigation be entered into concerning its merits. 3. That one of the judges should sit for the trial of patent cases exclusively; that he should be aided by scientific assessors; should sit without a jury unless the parties to the suit or action desire a jury, and, when sitting without a jury, that he should decide questions of fact as well as law. 4. that the granting of licences to use patented inventions ought not to be made compulsory. 5. That patents ought not to be granted to importers of foreign inventions. 6. That no patent should be extended beyond the original term of fourteen years. 7. That the Crown should be empowered to use patented inventions without having obtained the consent of the patentees, and should pay him for such use a sum to be fixed by the Treasury.

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Scientific American.

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

Vol. XII.—No. 6. (NEW SERIES.)

NEW YORK, FEBRUARY 4, 1865.

$3 PER ANNUM (IN ADVANCE.)

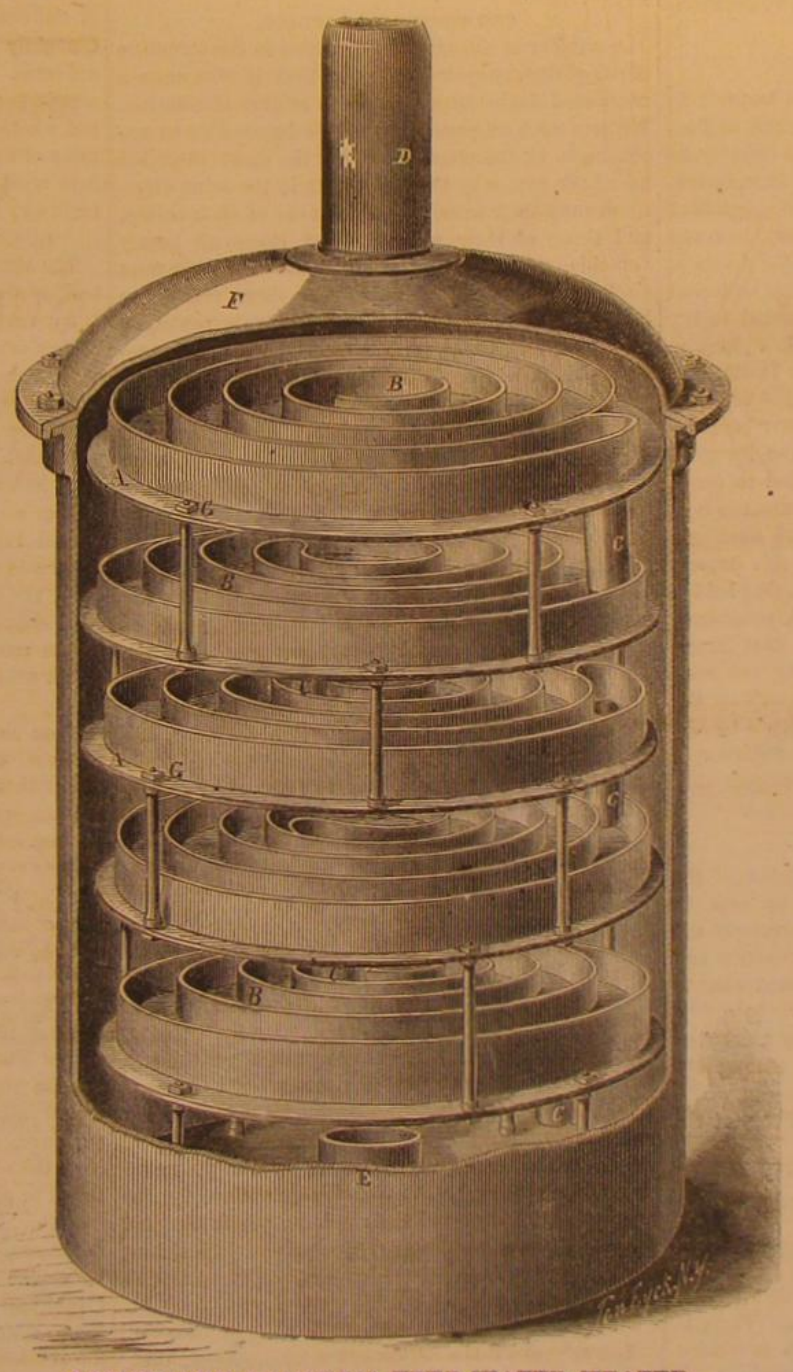
Improved Feed-water Heater.

A very great waste of fuel occurs in high-pressure steam engines where the exhaust passes off without imparting its heat to the feed water. It is well known to engineers that when the boiler is pumped up the pressure generally falls unless the heating surface is ample. The heaters commonly used, although they heat the feed water, are mischievous in another respect, for the exhaust is forced to traverse a coil or its equivalent, and go through intricate passages. This arrests its progress and causes undue back pressure on the piston, which it is desirable to avoid. The heater shown in the accompanying engraving is a very efficient one, for the water passing though it is heated to ebullition, while the exhaust openings are unreduced and unobstructed. The water is introduced to the heater at the top one of the series of plates, A, and flows through the annular channels, B, alternating from the center to the circumference of each in its passage to the bottom. A pipe, C, is fitted at the points above-mentioned, through which the water runs into each partition.

The exhaust enters the pipe, D, and fills the whole cylinder passing around, above and below each plate, so that it is in direct contact with the water to be heated; it finally emerges at the bottom opening, E. The feed water is also taken from the bottom compartment and admitted to the pump, so that by this arrangement the difficulty usually experienced in pumping hot water is obviated.

One great advantage of this heater is the deposition of minerals held in suspension by the water. The scale which ordinarily forms in boilers adheres to the plates of this heater, and may be easily cleaned off. As much as a bushel has been taken out at one time. The plates are readily got at for inspection by taking off the dome, F, each plate can then be lifted out by unscrewing the nuts, G, from the columns which support it. The water in rapid circulation takes up the heat of the steam passing through the heater, and fuel is thus economized and the boiler prevented from the injurious deposit of scale, as previously set forth.

This heater was patented by Messrs. Lamon and Gaskill. For further information address Ehrick Parmly, No 3 Bond street, New York.



LAMON AND GASKILL'S FEED-WATER HEATER.

The Flowing Well at "Pitt Hole."

A correspondent of the Pittsburgh, Pa., *Commercial* gives the following interesting account of a valuable well at Pit Hole, near Oil Creek, Pa.:—

"And what a strange and busy scene around the well itself! To get to it you pass through a forest, or rather grove, of lofty and venerable white pines. What a contrast to the impressive solitude which has reigned there for so long a period, disturbed, perhaps, only by the deer as they came down to drink. A number of men were hewing and hauling logs, and making corduroy roads, to render easier the ascent to the top of the bank. Another number were just putting the finishing strokes to a huge tank, to hold twelve hundred barrels of oil. Numerous horses, sleighs and curious visitors were grouped here and there. Still more men were engaged in filling barrels from the receiving tank, while scores of sleds were loading and driving off as fast as possible, their places being supplied by other scores.

"Mounting a rough ladder, you get your first view of the oil which has been so rudely disturbed from its long slumber far down in the very bowels of the earth. You see nothing but an iron two-inch pipe, with a stream of fluid flowing out as large as a heavy hydrant stream, and looking like country-house molasses and of about the same consistency. Every couple of minutes the gas—which can be plainly seen issuing from the tube-like waves of heat—gives the stream a little spurt, and then it resumes its even and steady flow. Standing over the well, the oil can be plainly heard ascending the tubing. Near by stands the engine-house, with its trim, polished and powerful engine from New York city, looking as demure and innocent as if its ceaseless and powerful workings were not the cause of all this hubbub. No need for an engine now, except to sink another well, for this 'big well' is a *flowing* not a *pumping* one. It runs by nature's gas, not by man's steam. How long it will thus flow, who knows except the Omniscient and Omnipresent Power who made the oil, and who has so mysteriously concealed it in the earth until man's need for it was greatest? The men about the well claimed for it a steady flow of two hundred and twenty-five barrels per day. Experienced oil men who visit it, assert that it flows *strong two hundred*. It may yet come up to three hundred, five hundred or even a thousand barrels per day. Eight or nine thousand dollars a day—minus a quarter royalty—besides the sales of land and leases at enormous figures, will afford the New York petroleumites a snug little interest on their modest investment. This well was sunk through four distinct strata of sand-stone rock, instead of three, as customary in other localities. The first sand-stone was reached at one hundred and fifteen feet; the second at three hundred and forty-five feet; the third at four hundred and eighty feet; the fourth at six hundred feet, and the oil itself at six hundred and fifteen feet. The well was pumped for a day or two, but the vast amount of gas in the subterranean caverns or fissures which held the oil, soon rendered useless that expense."

Regarding the social characteristics of the natives in the vicinity of this well, the correspondent promulgates the following scandal. 'Buckwheats' is a rustic cognomen indicative of the principal crop raised by the farmers thereabout:—

"They say here that when the 'Buckwheats' sell their farms for fifty, seventy-five or a hundred thousand dollars, they all go to Westfield or Jimtown, N. Y., to live and spend their money. At one place the farmer had sold out a couple of months before; the ambition of the man was to drive teams, and of his wife to keep a boarding-house for the men. A sled, having on board his whole family, was driven into Oil City by an old farmer carrying with him the title deeds of a fine farm somewhere near Pit Hole. The farm was soon picked up by an agent at a hundred thousand. The farmer's son—a stolid, shock-headed youth—was congratulated by some of the hotel stove-surrounders, when he simply remarked "Dad's farm might be darned good for ile, but it was so poor that dad couldn't raise a pint of beans on it."

POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

The Association held its regular weekly meeting at its room at the Cooper Institute, on Thursday evening Jan. 19, 1865, the President, S. D. Tillman, Esq. in the chair.

After a long discussion on pumps in which no facts nor ideas were advanced which we suppose would be new to any of our readers, the President invited Mr. Murdock to exhibit drawings of

SHAW'S ENGINE.

This may be described as Roper's air engine, with the addition of a steam boiler in which steam is generated by the exhaust air. An air-tight vessel, corresponding to the boiler of a steam engine, has a furnace within it; the air to supply the fire being forced in by an air-pump. As the air is heated and expanded it is worked through a cylinder, driving a piston as in the steam engine. On its passage from the engine to the chimney the hot air passes through the tubes of a steam boiler, generating steam, which is led into the air chamber containing the furnace, where it is superheated, and then it is worked with the air through the engine. Mr. Murdock having stated that this engine received a Rumford prize of $600, the President invited Dr. Charles T. Jackson, who was present, to give a history of

THE RUMFORD PRIZE.

Dr. Jackson:—Count Rumford left a bequest to the American Academy of Arts and Sciences, of Boston, the oldest scientific association in the country, to be devoted to improvements in light and heat, especially such as should be useful to the middle classes of the people. The Academy unfortunately has not displayed proper activity in discharging the duties of this trust. For forty years the only prizes bestowed were the gold and the silver medal, awarded to Dr. Hare, for the discovery of the compound blow pipe and the calcium light—improperly called the Drummond light. The fund has now increased to $30,000, and recently the members of the Academy have been demanding more energy *on* the part of the Rumford committee. The gold medal was awarded to Capt. Ericsson for his engine, not because his was the best air engine, but because his inventions and exertions had given such an impetus to efforts in this department, that they might be considered as having led the way to all subsequent improvements. A committee of the Academy, by careful trial, found that Ericsson's engine yielded one horse power by the consumption of 14 lbs. of coal per hour, Roper's by the consumption of 5 lbs, and this of Shaw's by the consumption of 2½ lbs., all being small engines. I have no doubt that this is the best air engine that has ever been produced.

THE GREAT EMERY BED.

By request, Dr. Jackson gave a description of the great emery mine recently discovered by him in Chester, Mass. This description was precisely the same as that published on page 34 of our current volume. Dr. R. P. Stevens asked Dr. Jackson what is the geological formation of this deposit.

Dr. Jackson illustrated the formation by a drawing on the black-board, showing that it is among the metamorphic rocks.

Dr. Stevens:—Has Dr. Jackson any theory of the way these rocks were crystalized?

Dr. Jackson:—I have no doubt it was by the action of superheated water, as illustrated by the beautiful experiments of M. Daubree.

Dr. Stevens:—It would propably be very interesting to the meeting to hear an account of those experiments.

THE EXPERIMENTS OF DAUBREE.

Dr. Jackson:—There is no difference of opinion among geologists in regard to the original formation of the stratified rocks; they were deposited at the bottoms of lakes and oceans. But some of these, since their deposit, have been metamorphosed or changed to a crystalline structure, and there has been much discussion in relation to the agencies by which this metamorphism was effected. It seems to me that M. Daubree has cut the Gordian knot, and has shown that the crystallization was produced mainly by the action of superheated water, that is water heated above the boiling point. This can be done, as you are aware, by confining the water under pressure. M. Daubree enclosed various substances in strong iron tubes, filled the tubes with water, closed them tightly with screw plugs, and had them built into the brick work of gas furnaces, where they were exposed constantly to a high temperature for several weeks or months. Wood thus enclosed was first melted and compressed into a globular mass, and if longer exposed was finally converted into anthracite coal. Glass was decomposed and its silex formed into beautiful quartz crystals. M. Daubree found that if sufficient time was allowed it was not necessary even that the water should be superheated. The warm springs of Plombiers were used for baths by the Romans, who led the water through aqueducts constructed of brick or cement. On examining the material of these aqueducts, which had been subjected to the action of warm water for 2000 years, it was found to be transformed into the same crystalline minerals that occur in the metamorphic rocks.

HEAT AND FORCE OF THE SOLAR SYSTEM.

Professor Helmholtz, in his essay on The Interaction of Natural Forces, recently republished by D. Appleton & Co., presents these facts and calculations in regard to the heat and force developed in the solar system.

THE THEORY OF LAPLACE.

A number of singular peculiarities in the structure of our planetary system indicate that it was once a connected mass with a uniform motion of rotation. Without such an assumption, it is impossible to explain why all the planets move in the same direction round the sun, why they all rotate in the same direction round their axes, why the planes of their orbits, and those of their satellites and rings all nearly coincide, why all their orbits differ but little from circles, and much besides. From these remaining indications of a former state, astronomers have shaped an hypothesis regarding the formation of our planetary system, which, although from the nature of the case it must ever remain an hypothesis, still in its special traits is so well supported by analogy, that it certainly deserves our attention. It was Kant, who, feeling great interest in the physical description of the earth and the planetary system, undertook the labor of studying the works of Newton, and as an evidence of the depth to which he had penetrated into the fundamental ideas of Newton, seized the notion that the same attractive force of all ponderable matter which now supports the motion of the planets, must also aforetime have been able to form from matter loosely scattered in space the planetary system. Afterwards, and independent of Kant, Laplace, the great author of the *Mecanique Celeste*, laid hold of the same thought, and introduced it among astronomers.

The commencement of our planetary system, including the sun, must, according to this, be regarded as an immense nebulous mass which filled the portion of space which is now occupied by our system, far beyond the limits of Neptune, our most distant planet. Even now we perhaps see similar masses in the distant regions of the firmament, as patches of nebulæ, and nebulous stars; within our system also, comets, the zodiacal light, the corona of the sun during a total eclipse, exhibit remnants of a nebulous substance, which is so thin that the light of the stars passes through it unenfeebled and unrefracted. If we calculate the density of the mass of our planetary system, according to the above assumption, for the time when it was a nebulous sphere, which reached to the path of the outmost planet, we should find that it would require several cubic miles of such matter to weigh a single grain.

EFFECT OF CONTRACTION.

Let us make this addition to our assumption; that, at the commencement, the density of the nebulous matter was a vanishing quantity, as compared with the present density of the sun and planets; we can then calculate how much work has been performed by the condensation; we can further calculate how much of this work still exists in the form of mechanical force, as attraction of the planets towards the sun, and as *vis viva* of their motion, and find, by this, how much of the force has been converted into heat.

The result of this calculation is, that only about the 454th part of the original mechanical force remains as such, and that the remainder, converted into heat, would be sufficient to raise a mass of water equal to the sun and planets taken together, not less than twenty-eight millions of degrees of the centigrade scale. For the sake of comparison, I will mention that the highest temperature which we can produce by the oxyhydrogen blowpipe, which is sufficient to fuse and vaporize even platina, and which but few bodies can endure, is estimated at about two thousand centigrade degrees. Of the action of a temperature of twenty-eight millions of such degrees we can form no notion. If the mass of our entire system were pure coal, by the combustion of the whole of it only the 3500th part of the above quantity would be generated. This is also clear, that such a development of heat must have presented the greatest obstacle to the speedy union of the masses, that the larger part of the heat must have been diffused by radiation into space, before the masses could form bodies possessing the present density of the sun and planets, and that these bodies must once have been in a state of fiery fluidity. This notion is corroborated by the geological phenomena of our planet; and with regard to the other planetary bodies, the flattened form of the sphere, which is the form of equilibrium of a fluid mass, is indicative of a former state of fluidity. If I thus permit an immense quantity of heat to disappear without compensation from our system, the principle of the conservation of force is not thereby invaded. Certainly for our planet it is lost, but not for the universe. It has proceeded outwards, and daily proceeds outwards into infinite space; and we know not whether the medium which transmits the undulations of light and heat possesses an end where the rays must return, or whether they eternally pursue their way through infinitude.

QUANTITY OF HEAT IN THE EARTH'S MOTION.

The store of force at present possessed by our system, is also equivalent to immense quantities of heat. If our earth were by a sudden shock brought to rest on her orbit—which is not to be feared in the existing arrangements of our system—by such a shock a quantity of heat would be generated equal to that produced by the combustion of fourteen such earths of solid coal. Making the most unfavorable assumption as to its capacity for heat, that is, placing it equal to that of water, the mass of the earth would thereby be heated 17,200 degrees; it would therefore be quite fused and for the most part reduced to vapor. If, then, the earth, after having been thus brought to rest, should fall into the sun, which of course would be the case, the quantity of heat developed by the shock would be four hundred times greater.

METEORS.

Even now, from time to time, such a process is repeated on a small scale. There can hardly be a doubt that meteors, fire-balls, and meteoric stones, are masses which belong to the universe, and before coming into the domain of our earth, moved like the planets round the sun. Only when they enter our atmosphere do they become visible and fall sometimes to the earth. In order to explain the emission of light by these bodies, and the fact that for some time after their descent they are very hot, the friction was long ago thought of which they experience in passing through the air. We can now calculate that a velocity of 3000 feet a second, supposing the whole of the friction to be expended in heating the solid mass, would raise a piece of meteoric iron 1000° C. in temperature, or, in other words, to a vivid red heat. Now the average velocity of the meteors seems to be thirty or forty times the above amount. To compensate this, however, the greater portion of the heat is, doubtless, carried away by the condensed mass of air which the meteor drives before it. It is known that bright meteors generally leave a luminous trail behind them, which probably consists of several portions of the red-hot surfaces. Meteoric masses which fall to the earth often burst with a violent explosion, which may be regarded as a result of the quick heating. The newly-fallen pieces have been for the most part found hot, but not red-hot, which is easily explainable by the circumstance, that during the short time occupied by the meteor in passing through the atmosphere, only a thin, superficial layer is heated to redness, while but a small quantity of heat has been able to penetrate to the interior of the mass. For this reason the red heat can speedily disappear.

Thus has the falling of the meteoric stone, the minute remnant of processes which seem to have

played an important part in the formation of the heavenly bodies, conducted us to the present time, where we pass from the darkness of hypothetical views to the brightness of knowledge. In what we have said, however, all that is hopothetical is the assumption of Kant and Laplace, that the masses of our system were once distributed as nebulæ in space.

TINNING SHEET IRON.

Dr. Ure, after giving a brief history of processes formerly in use, says:—"The process of cleaning and tinning at some of the best works now is as follows:—When the sheet iron leaves the plate mill, and after separating the plates, and sprinkling between each plate a little sawdust, the effect of which is to keep them separate, they are immersed, or, as technically termed, "pickled," in dilute sulphuric acid, and after this placed in the annealing pot, and left in the furnace about 24 hours; on coming out, the plates are passed through the cold rolls; after passing through the cold rolls, the plates seem to have too much the character of steel, and are not sufficiently ductile; to remedy this they are again annealed at a low heat, washed in dilute sulphuric acid, to remove any scale of oxide of iron, and scoured with sand and water; the plates in this state require to be perfectly clean and bright, and may be left for months immersed in pure water without rust or injury; but a few minutes' exposure to the air rusts them. With great care to have them perfectly clean they are taken to the stow.

The tinman's pan is full of melted grease; in this the plates are immersed, and left there until all aqueous moisture upon them is evaporated, and they are completely covered with the grease; from this they are taken to the tin pot and there plunged into a bath of melted tin, which is covered with grease; but as in this first dipping the alloy is imperfect, and the surface not uniformly covered, the plates are removed to the dipping or wash pot; this contains a bath of melted tin covered with grease, and is divided into two compartments. In the larger compartment the plates are plunged, and left sufficiently long to make the alloy complete, and to separate any superfluous tin which may have adhered to the surface; the workman takes the plate and places it on a table, and wipes it on both sides with a brush of hemp; then to take away the marks of the brush, and give a polish to the surface, he dips it in the second compartment of the wash pot. This last always contains the purest tin, and as it becomes alloyed with the iron it is removed on to the first compartment, and after to the tin pot. The plate is now removed to the grease pot; this is filled with melted grease, and requires very skillful management as to the temperature it is to be kept at. The true object is to allow any superfluous tin to run off, and to prevent the alloy on the surface of the iron plate cooling quicker than the iron. If this were neglected the face of the plate would be cracked. The plate is removed to the cold pot; this is filled with tallow, heated to a comparatively low temperature. The use of the grease pots, is the process adopted in practice for annealing the alloyed plates. The list pot is used for the purpose of removing a small wire of tin, which adheres to the lower edge of the plate in all the foregoing processes. It is a small cast iron bath, kept at a sufficiently high temperature, and covered with tin about one-fourth of an inch deep. In this the edges of the plates are dipped, and left until the wire of tin is melted, and then detached by a quick blow on the plate with a stick. The plates are now carefully cleaned with bran to free them from grease. Lastly, they are taken to the sorting room, where every plate is separately examined and classed, and packed in boxes for market.

"The tests of quality for tin plates are—ductility, strength and color. To obtain these the iron must be of the best quality, and the manufacture must be conducted with proportionate skill. This necessity will explain to some extent the cause why nearly all the improvements in working iron during the past century have been either originated or first adopted by the tin-plate makers; and a sketch of the processes used at different times, in working iron for tin plates, will be, in fact, a history of the trade.

A PAIL of water will sometimes stop a squeaking ournal when oil is of no avail.

THE LINEN MANUFACTURE IN IRELAND.

Sir Robert Kane, F. R. S., recently read before the Society of Arts a paper from which we take the following extracts:—

"Of all branches of industry, however, that which is of the most importance to Ireland, from the amount of capital it represents, and the number of persons to whom it gives occupation, is the linen trade. I am indebted to the kindness of Mr. M'Ilwrath, secretary to the linen trade of Belfast, for much valuable information on that subject, and also to Mr. M Call, of Lisburn, for many interesting particulars, of which I shall endeavor to lay before the Society such general heads as our limited time may allow.

"The linen trade of which Belfast has been the long established head quarters in Ireland had been rather falling off in amount, until the interruption of the supply of cotton by the American war called it into immensely increased activity. The contrast in this regard is well shown by the following figures:—In 1859 there were in Ireland 82 flax-spinning mills, containing 651,872 spindles, of which 91,230 were unemployed; whilst in 1864 there were 74 spinning mills with 650,744 spindles, of which but 8,860 were unemployed, whilst 50,638 additional spindles were in May last being set to work. Further, in addition to the above there were employed in 1864, 14,648 spindles occupied in making thread, and five mills were in course of erection to contain 45,000 spindles. In regard to power-loom factories for linen, a similar remarkable increase is shown for the same period. Thus, in 1859, there were 28 factories with 3,633 looms, of which 509 were unemployed; whilst in 1864 there were 42 factories with 8,187 looms, of which but 258 are unemployed; 1,685 additional looms were about being set to work at the date of the return in May last. The introduction of the factory system into the linen trade, and especially the power-loom, is comparatively modern, the first spinning mills for flax in Ireland having been established about 1828, previously to which time cotton spinning was much more extensively carried on in Belfast than it has since been.

The great extension of trade and the benefit to the operative classes which followed this change, may be illustrated by the following fact:—When spinning and weaving were done by hand, the firm of Richardsons, of Lisburn, turned out from 15,000 to 20,000 pieces of goods in twelve months; that firm can now deliver 250,000 pieces of bleached goods in the same time.

As to wages in the old day of spinning on the domestic wheel, the earnings were from 2s. 6d. to 4s. (62 cts. to $1.00) weekly, whilst at present in spinning mills the ordinary work-women make from 3s. 6d. to 6s. (86 cts. to $1 50) per week, and superior hands from 6s. to 8s. ($1 50 to $2). The best hand loom weaver can only make 6s. per week, out of which he has to pay charges which leave him only 5s, ($1 25) whereas an expert girl, who can attend to two power looms, can make 10s. ($2 50) per week clear. Thus the earnings of individuals have been materially increased by the introduction of steam machinery in the linen trade; and in regard to the total amount of employment, there were ten years ago, 17,000 persons employed in this trade in and about Belfast, whereas in the present year the number employed in the mills is 25,000, exclusive of the vast number of outsiders who indirectly derive their subsistence from that branch of manufacture.

Coupled with this development of the linen trade there has taken place a great increase in the quantity of flax cultivated in Ireland. During the Crimean war, when the Baltic trade was subjected to certain impediments, the quantity of land under flax was increased, and amounted, in 1853, to 174,579 acres, but on the restoration of peace, the Baltic trade being resumed, the demand for home grown flax diminished, and the cultivation fell off to 91,646 acres in 1858. Since that time it has progressively increased, and has now assumed proportions entirely unprecedented, the quantity in 1863 having been 214,099 acres, and in the present year having increased to 301,942 acres, which at an average of 35 stone of clean scutched flax to the acre, gives the produce of fiber at 10,557,070 stones, or 66,050 tuns; and at an average price of 7s. 6d. per stone, the total value of the crop of the present year is £3,962,989. This great increase of production is accompanied of course with corresponding increase of the export trade.

THE MANUFACTURE OF STARCH.

The extensive discussion of the manufacture of sirup from the starch contained in Indian corn naturally gives an interest to the methods employed for extracting the starch. It is a maxim among chemists never to employ chemical processes when the result can be reached by a mechanical process. Starch exists in grain and can be separated by simply washing. Any one attempting to make sugar or sirup from corn will doubtless find it best to separate the starch first by approved methods, and then treat this pure starch with sulphuric acid to convert it into sugar. We extract from Ure the method practiced in England for separating starch from wheat, and we take from Appleton's Cyclopaedia some statements in regard to the manufacture of starch in this conntry from Indian corn:—

In England, wheat crushed between iron rollers is laid to steep in as much water as will wet it thoroughly; in four or five days the mixture ferments, soon afterwards settles, and is ready to be washed out with a quantity of water into the proper fermenting vats. The common time allowed for the steep, is from 14 to 20 days. The next process consists in removing the stuff from the vats into a stout, round basket set across a back below a pump. One or two men keep going round the basket, stirring up the stuff with strong wooden shovels, while another keeps pumping water, till all the farina is completely washed from the bran. Whenever the subjacent back is filled, the liquor is taken out and strained through hair sieves into square frames or cisterns, where it is allowed to settle for 24 hours; after which the water is run off from the deposited starch by plug taps at different levels in the side. The thin stuff called slimes, upon the surface of the starch, is removed by a tray of peculiar form. Fresh water is now introduced, and the whole being well mixed by proper agitation, is then poured upon fine silk sieves. What passes through is allowed to settle for 24 hours; the liquor being withdrawn, and then the slimes, as before, more water is again poured in, with agitation, when the mixture is again thrown upon the silk sieve. The milky liquor is now suffered to rest for several days, four or five, till the starch becomes settled pretty firmly at the bottom of the square cistern. If the starch is to have the blue tint, called Poland, fine salt must be mixed in the liquor of the last sieve, in the proportion of two to three pounds to the cwt. A considerable portion of these slimes may, by good management, be worked up into starch by elutriation and straining.

The starch is now fit for boxing, by shoveling the cleaned deposit into wooden chests, about four feet long, twelve inches broad, and six inches deep, perforated throughout, and lined with canvass. When it is drained and dried into a perfect mass, it is turned out by inverting the chests upon a clean table, where it is broken into pieces four or five inches square, by laying a ruler underneath the cake, and giving its surface a cut with a knife, after which the slightest pressure with the hand will make the fracture. These pieces are set upon half burned bricks, which by their porous capillarity imbibe the moisture of the starch, so that its under surface may not become hard and horny. When sufficiently dried upon the bricks, it is put into a stove (which resembles that of a sugar refinery,) and left there till tolerably dry. It is now removed to a table, when all the sides are carefully scraped with a knife; it is next packed up in the papers in which it is sold; these packages are returned into the stove, and subjected to a gentle heat during some days; a point which requires to be skilfully regulated.

In the United States Indian corn and potatoes are most commonly used for starch. The application of the former to this use was patented by James Colman, in 1841, and was successfully practised by Thomas Kingsford, of Oswego, N. Y., in 1842. In 1849 he had a large factory at that place, which is still in successful operation under the direction of Messrs. T. Kingsford and Son, having up to the end of the year 1860 made nearly 30,000 tuns of starch. Its annual production for five years was as follows:—1856, 6,328,453 lbs.; 1857, 8,018,778 lbs.; 1858, 8,686,516 lbs.; 1859, 6,747,586 lbs.; 1860, 8,500,000 lbs.; far exceeding that of any other starch factory in the world for the same time. The total consumption of raw material in the twelve years from Jan. 1, 1849, was 2,476,000 bushels of Indian corn and 164,448 bushels of wheat, besides some damaged flour. The boxes for packing the starch have required 15,000,000 feet of bass-wood, supplied chiefly by the farmers in the neighborhood. The building has a front of 510 feet, and extends back over the Oswego river 250 feet. Its flooring covers 250,600 feet, or nearly six acres. For grinding the corn there are fifteen pairs of buhrstones, and six pairs of large, heavy iron rollers. The river furnishes the power to drive the machinery, and a steam engine of 140 horse power is provided to make up any deficiency in very dry seasons. The vats employed in purifying the starch have a capacity of 2,200,000 gallons, and the length of gutters for conveying and distributing the starch waters is over three miles. A similar factory, almost or quite similar to this in capacity, commenced operations at Glen Cove, on Long Island, in 1858. This also uses Indian corn, which is more cheaply transported from the western states than the starch from it would be. The product of each bushel is about 23 lbs., and the boxes of the starch, on account of their bulk and the extra care they require, make more expensive freight than the raw material. Potato starch factories are more numerous but not so

extensive. In the town of Stowe, Vt., there are five of them, each one of which consumes from 16,000 to 20,000 bushels of potatoes yearly, and produces about 8 lbs. of starch to the bushel.

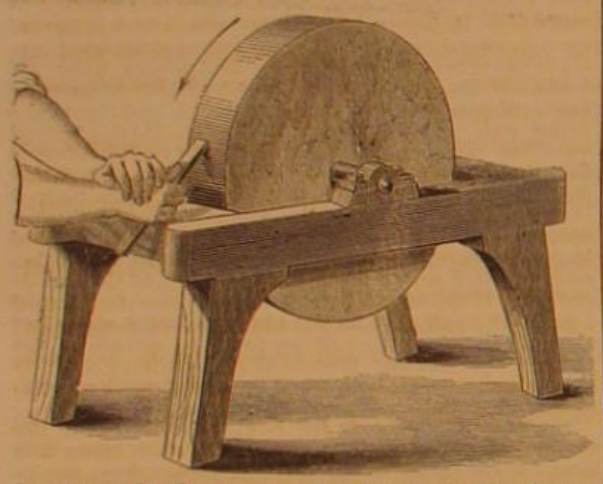
The corn used for starch is the white flint kind. Received at the factory, it is hoisted to the top of the building, winnowed to remove foreign substances, and then transferred to vats, where it is long soaked before grinding. It is run through troughs with water to the mills, and when ground the mixed meal and water is conveyed in a similar manner to the tubs in which the separation of the starch is effected. The gluten fluid that flows from these has a musty and disagreeable odor and appearance in the troughs, and the substance leaks when concentrated the consistency of wheat gluten, not "rising" like it in fermentation by the expansive action of the carbonic acid gas generated in this process. Its only value is for feeding horses, cattle and swine. The starch fluid is conveyed through troughs to great vats in the basement of the building, where the water is partially removed, and then it flows into smaller wooden vessels from which a portion of the surplus water drains away through a cloth laid in the bottom of each. The mass of starch, then tolerably solid, is placed upon shelves made of loose bricks, when more moisture escapes by absorption and evaporation. Kiln drying finishes the process and the starch is obtained in prismatic forms ready to be put up in papers or boxes for the market.

TURNING TOOLS.

PART SIXTH.—THE END.

As grinding a tool and keeping the edge in proper condition is very essential to success, it will not be amiss to state a few facts of importance in regard to it. Inexperienced turners always go on the wrong side of the stone to grind; that is, when it runs from them. Every tool, no matter what its character, should be ground with the stone running toward the workman, as in Fig. 28—the direction of motion be-

Fig. 28.



ing shown by the arrow. The reason for this is apparent to any one who thinks for a moment. It is this—viewed through a magnifying glass the edge of every tool presents a serrated or saw-tooth appearance.

When the tool is ground with the stone running from the operator, all these fine threads, or filaments of steel, are drawn off toward the outside or upper edge, so that it forms what is known as a wire edge; the first application to the work breaks these off, and in a little while the tool is as dull as before it was ground. If, on the contrary, the tool be held against the face of the stone on the running side, as shown previously, the metal will be cut downwards, and a keen sharp edge produced, which will last much longer than when ground on the other side; it only requires an oil stone rubbed over it to remove the asperiites and render the edge uniform. As the tool comes from the grindstone it is invariably rough, however smooth it may appear to the naked eye, and it is a good practice to touch up the edge preparatory to putting it in the tool post. It is this rubbing with the oilstone that gives that incomparable finish to wrought iron when the tool is sharp. Such a polish is more durable than any that can be imparted with emery or oil, superior in appearance and cheaper to produce; cardinal points in favor of using a sharp turning tool.

There are many tools which cannot be ground upon the stone without destroying the shape. Tools for forming beads or moldings are of this class, but as they are generally used on cast iron; they are intended to scrape rather than cut, and the faces can therefore be ground flat. It is generally easier to file the tool to the required shape and grind it when dull.

Tools that are filed have two disadvantages which make them inferior to those tempered and ground subsequently. When a tool is tempered, the smith dresses the edge by repeated blows, and compacts the metal at that point very closely, thus making it tougher and finer in grain, The hardening process is also an advantage, for the edge is less apt to be wiry than when the metal is fibrous; which is the case with annealed steel. A tool that is to be filed into shape must necessarily be soft previously, and though the workman may be an adept, he is very likely to slur the fine edge over in forming it, and make it rough and dull, instead of sharp. When the edge of a filed tool is tempered it is apt to crumble, and is, in many other respects, inferior to one that is ground.

For turning a molding or bead on a side pipe, or cylinder head, such as the one shown in this figure,

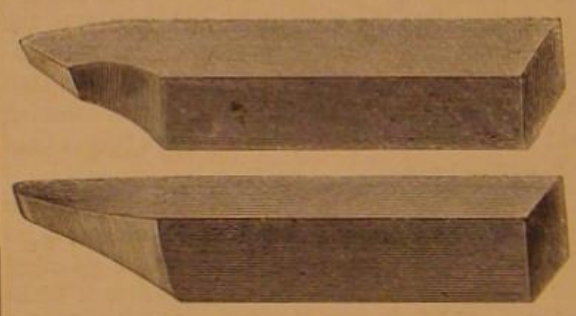
Fig. 29.



it will be found convenient to make the beading tool on the spring plan, illustrated in Fig 18, current volume. By this method it is less likely to chatter or leave ridges or cut roughly.

Of tools other than those used for cutting wrought and cast iron, there are few which are materially different in external appearance. To this statement there is one exception. Brass cannot be cut by the same tools that are used for iron. Below, in Fig. 30,

Fig. 30.



we give examples of tools for turning brass. It will be seen that they are perfectly straight on the upper faces, and have no lips or acute edges. It is not possible to cut brass with a drill, or any other tool, that has a cleaving edge. Such edges draw in to the metal and throw it out of the lathe or else jam and break off. There are compositions of copper and tin, zinc and copper, and others, which can be cut by common tools, but these are not brass, which consists of specific portions of certain metals. One of these tools—the round nose—is used for light cuts, and the other where larger amounts of metal have to be taken off at once.

In turning wrought iron very many turners make their tools quite hard and cut the metal dry or without water; preferring to absorb power rather than soil the lathe with sloppy combinations of iron and water. With proper care but little "muss" will be made, while the gain in time, by using water, is very apparent. Not less important is the power required to drive a given number of lathes. Those which run dry require more than tools used with water, for the simple reason that the friction is greater. Any one can test this to his entire satisfaction by putting a tool in a lathe, starting the cut, and driving the machine by hand. It will be found that when the chip is of such a size that the arm can hardly turn the lathe dry, the addition of water will free it immediately, and the lathe can be driven with ease. If the shears be well oiled previous to beginning a job, the water can be wiped off without injury to them, even though the work be days in progress.

This article concludes the series on this subject. The skilled turner will perceive many cases not laid down in the several papers under this head which might have been alluded to, but it is obviously impossible in the limits of a newspaper to detail every minute manipulation a lathe is capable of. Special instruction on particular points has not been aimed at, but a general and familiar treatise on the tools used in turning.

SEASONING AND DRYING LUMBER AND TIMBER.

[For the Scientific American.]

A COMPARISON OF SUPERHEATED STEAM WITH OTHER MODES OF SEASONING, AS IT REGARDS SPEED, THOROUGH WORK AND CHEAPNESS.

It seems to be a great mystery to the uninitiated how lumber, and other substances, can be dried while in direct contact with steam.

All understand that steamed lumber will dry in the open air, more rapidly after, than before, it is steamed—though all do not understand why it does it. They notice that the lumber comes from the steam in a very wet and soaked state, and the general impression would be, that it would require a longer time to dry than before it was thus soaked.

The fact however that it does dry more rapidly, has induced many to adopt this mode, when they were in haste for some dry lumber, even though practical tests have shown that such steaming injures its beauty of finish, as well as the strength and durability of the lumber and timber. The reason for this will be seen.

This steaming and soaking process extracts the albumen, which if properly coagulated and retained, is a preservative to the lumber. It also expands the pores of the lumber, so that they never shrink again to their smallest size, and do not often return as tubes, but shrink into angles; thus injuring the strength as well as beauty of finish. If these improperly shrunk tubes were placed under a powerful microscope, they would look like hills and valleys and very high ones.

This albumen is somewhat difficult to dry in the pores of the lumber, by air drying, for it does not part with its moisture readily, and when dried in the outside pores of the lumber, it nearly hermetically seals the inside, as it becomes nearly impervious to moisture.

Many attempts have been made to get rid of this albuminous substance in the lumber, for even after it has been once dried, it will ferment, if water be added, and this fermentation produces eramacausis or dry rot, which destroys millions of dollars' worth of railroad timbers, ties, and bridges, per year, as well as timber in buildings, ships, &c.

Kyanizing, paynizing, burnetizing, and other similar processes, are only modes used to coagulate or chemically change this albumen, by using the various kinds of salts, such as corrosive sublimate, zinc, copperas, &c. Many of these modes have been found to be valuable for preserving the timber from the dry rot. But since these processes are usually performed by soaking or steeping the lumber in a solution of these salts, much of the albumen passes out, to the injury of the lumber; for when all of the strength and beauty of finish is desirable, the albumen should be coagulated and retained in the pores of the lumber. Of course the lumber comes from all these processes as well as in steaming, boiling, or soaking in water—in a wet and soaked state, and must therefore be used in the wet state, or afterwards dried by the air, either naturally or artificially. In either case, the outside of the timber is dried first, and forms an enamel, which will not further shrink, as the drying progresses, and therefore the timber cannot be brought to its smallest size, even though the drying process be continued forever.

Air drying we must remember always commences on the outside of the lumber, and its tendency is to close up its own way, and check materially its own progress, forming an enamel with dried albumen, and by closing the pores of the lumber on the outside first. The further therefore the drying extends into the lumber by this process the slower must be the future drying, for the passage of the moisture from the inside is the more strongly resisted, the thicker this enamel becomes. Is it any wonder, therefore, that the center of thick lumber is rarely ever dried. Comparatively small sticks of oak timber have been used for a fire piece for at least sixty years.

Many millions of dollars have been expended in experiments to season and dry lumber. The result has generally proved to be drying without seasoning, and seasoning without drying. But when both seasoning and drying have been attained by subjecting the lumber first to one process and then to the other, the result has usually been a sacrifice of the strength and

durability of the lumber, as well as its beauty of finish, to say nothing of time and expense.

In contrast with the foregoing plans we will now examine the new mode, that seasons and dries at the same time, by what is called superheated steam without pressure, or with the simple pressure of the atmosphere. No other mode known to science has ever accomplished this, and yet the process is a very simple one, as I shall attempt to show, though I may fail to make it fully understood in an article that would not be too long for insertion here. If the principle, however, should still be obscure to any one they can inquire by mail.

Suppose a room 14 feet high be divided so that the lower room shall be 8 feet and the upper one 6 feet high. The lower we will call the fire steam room, and the upper the lumber or drying room. The division, however, between these rooms is only the joist on which the lumber is piled, or that sustains the cars on which the lumber is dried, and on which it is passed into and out of the dryer. The two rooms are, therefore, virtually one.

A stove or other heater, with long radiating or smoke pipe, to save all of the heat from escaping into the chimney, as well as to generate heat rapidly, is placed in the fire room, with the door of the stove opening out to supply fuel. This stove and the radiators are placed quite at the lower part of the fire room, which avoids the direct heat of the stove on the lumber, and also to occupy the coldest part of the room, which is the most favorable for obtaining all the heat of the fuel.

A steam generator may be so arranged at a small expense, in connection with the heater, that steam will be generated just in proportion to the heat made.

This steam, whether generated in this or in some other convenient way, should be just sufficient in amount to fill both the fire and lumber room, with no steam to pass off to waste the heat. As soon as the rooms are filled with steam the air is excluded and the steam takes its place for conveying caloric. Steam will convey heat by convection 90 to 300 times as rapidly as air.

This steam atmosphere is not one that can be seen but one that can be felt. It starts a free perspiration from all of the pores of the skin when you go into the kiln. It does the same thing to lumber, for it never wets or swells the lumber as by common steam, but the first act is a drying one, as the tendency of the moisture of the lumber is all outward; let us see how this is accomplished.

Steam as soon as it is generated rises. As soon, however, as a particle of steam meets a body colder than itself it instantly imparts its heat to that body and is condensed. This particle of condensed steam descends by its own gravity to the fire room. Here it comes into contact with the stove or radiators, and is re-converted into steam, and carries its heat to the lumber and descends again in its condensed form for more heat. This one particle of steam may carry up heat in this way a million times, and yet it has imparted no moisture to the lumber, as it has returned with its moisture in the shape of condensed steam. If by any accident this one particle of steam is absorbed or lost, the steam generator supplies another particle to take its place, and thus preserves a constant steam atmosphere among the timber, not only to convey heat but to shut out the air.

It is worthy of note in this connection, to state that a particle of steam will instantly receive as many degrees of heat as there are degrees in the heater with which it may come in contact. If for instance the stove should be red-hot, and the particle of returning or condensed steam should come in contact with the red-hot iron, this particle of steam would instantly receive at least 900 degrees of heat. This 900 degrees of heat would be carried to the lumber, and the condensed particle of steam would return for more heat in the same time as though it carried only 212 or any other number of degrees of heat.

It is also worthy of note that the tendency of steam is to fly to the coldest place to impart its heat. If, for instance, a ball of ice were suspended at the ceiling of a room, and some water should be thrown upon a hot stove in the room the steam thus generated would go continually to the ice until it was melted. Thus as an equalizer of heat steam has no equal

This superheating and condensing of steam in particles goes constantly on in the kiln, and with a rapidity just in proportion to the amount of heat generated by the stove or heater. All of the heat which the stove makes the steam will absorb and convey to the lumber. If heat is generated rapidly the steam will convey it rapidly to the lumber. Inch lumber has in this way been thoroughly seasoned in six hours.

This mode of heating and condensing progresses until the lumber is so hot that the aqueous or watery portion of the sap is changed into steam.

Up to this time you will notice all of the heat we have made is yet in the kiln, for there has been no means of escape to waste it, nor have we made the lumber wet or damp by the steam since the steam has only imparted its heat and not its moisture or condensed steam.

But when the lumber is all so hot as to generate steam rapidly from the water it contains, then there will be more steam than the kiln can contain, for it was full of steam before. This excess of steam must pass out of the kiln or the kiln would burst and the lumber would never become dry.

When this surplus heat passes out it escapes through sawdust or a similar device to retain the heat while getting rid of the steam. This sawdust should be of such a thickness as to balance the steam, retaining a full steam atmosphere inside, while the surplus steam passes out, taking with it the moisture from the lumber. As there is a steam atmosphere at all times surrounding the lumber to be dried, it cannot dry the outside first and form an enamel, as in the case of air drying.

The nature of steam is so penetrating that it finds the center of the lumber, before the drying has made any considerable progress. After the drying commences steam generated from the lumber is constantly flowing out, so that the pores of the lumber cannot close until the moisture is principally out of the lumber, and then the center must dry first, for the steam must leave the center before it leaves the outside.

When the aqueous portion of the sap has all been converted into steam and passed out of the lumber, it creates a vacuum which the pores of the lumber close to supply. When this is done the lumber has shrunk to its smallest size, or to as nearly a solid as drying can make it.

But as there is moisture in red-hot iron, so there must be some moisture left in the lumber after the pores close and after the shrinking is all done. Indeed if the moisture was all removed the lumber would be ruined for charring commences long before the moisture is all out.

By gaging a piece of timber in the kiln from day to day, it is quite easy to ascertain when the shrinking is all done. When the shrinking of the lumber is completed there is no further advantage in drying, but a positive injury, as far as the strength and toughness is concerned, for the more moisture there is left in the lumber and timber after the shrinking is all done, the better. If desired, however, the lumber may come from the steam in a dryer state than the air can ever make it.

I am admonished, however, that this article will soon be too long for insertion in the SCIENTIFIC AMERICAN, and I will reserve, perhaps for No. 3, the degrees of heat necessary to coagulate albumen in lumber at its different stages of drying, and perhaps say something of the degrees of this kind of heat desirable in the drying of fruit and vegetables, and also show why we may use a higher degree of this kind of heat than of air in drying delicate fruits, milk, etc., and still not injure them. I have dried apples in a heat of 239° and still they showed no indications of being cooked by the process, but came out very white and beautiful.

But before I close I will bring into juxtaposition superheated steam and other modes of drying, in order to show the advantages of superheated steam by comparison.

The air dries only. Superheated steam seasons and dries at the same time. The air dries slowly—steam quickly. The air produces decay and wastes heat while drying. Superheated steam adds strength and beauty of finish and saves heat. The interest on lumber while air drying must be for years—steam for days. Air can never shrink lumber so thoroughly that steam can not shrink it more, either in size or weight.

Common steaming, kyanizing, paynizing, and burnetizing, all season lumber, but swell it to its utmost capacity, and leave it wet and soaked. It would require more fire to dry this soaked lumber by the hot air process than to season and dry it from the green by the new mode. If the lumber is to be immediately shipped the difference in weight will be from 1400 to 2000 pounds per thousand feet board measure.

One month's stock of lumber for a manufacturer having a proper steam dryer will give him better seasoned lumber than a four years' stock in the air, thus saving the interest on stock, storage, checks, splits, warps and decay, incident to open air drying. The interest at 10 per cent on lumber costing only 40 cents per M. will be $16 while air drying for four years, and then that same lumber is not fit for good work unless kiln dried. It can be seasoned and dried by superheated steam, in a better manner than any other, at a cost of 50 cents to $1 per M., according to the expense of fuel. H. G. BULKLEY.

CLEVELAND, OHIO, Jan. 9, 1865.

VALUABLE PRACTICAL RECIPES.

To Etch Alabaster—Cover every portion of the model or cast, except the portion to be etched, with a mixture of one part of white wax, dissolved in four parts of oil of turpentine, thickened with finely powdered white lead. When this coating is set, immerse the article in pure water, and allow it to remain for from twenty to fifty hours, according to the effect intended to be produced. Then take it out, remove the superfluous water, wash off the varnish with oil of turpentine, and carefully brush the etched parts over with powdered gypsum.

Alabaster, to Join.—Ornaments of alabaster or plaster may be joined together by means of a little white of egg, thickened with finely-powdered quicklime, or by a mixture of newly-baked and finely-powdered plaster of paris, mixed up with the least possible quantity of water.

Almond Paste.—Blanched almonds 4 oz.; white of 1 egg; spirit of wine and rose water, q. s. Beat the almonds to a smooth paste in a mortar, then add the white of egg and enough rose water, mixed with one-half its weight of spirit of wine, to give the proper consistence. Use as a cosmetic, to prevent chapped hands, etc.

Amber is Joined and Mended by smearing the surfaces of the pieces with linseed or boiled oil, and then strongly pressing them together, at the same time holding them over a charcoal fire, or heating them in any other way in which they will not be exposed to injury.

Amber is Worked in a lathe, polished with whiting and water or oil, and finished off by friction with flannel. During the operation the pieces often become hot and electrical, and fly into fragments, to avoid which they should be kept cool, and only worked for a short period at a time. The workmen are said to suffer considerably from electrical excitement, often experiencing severe nervous tremors of the hands and arms.

Bell Metal.—Melt together, under powdered charcoal, 100 parts of pure copper, with 20 parts of tin, and unite the two metals by frequently stirring the mass. Product very fine. Another method is to take of copper 3 parts; tin 1 part, as above. Some of the finest church bells in the world have this com position.

Popular Remedies for Coughs.—Sirup of poppies, 1 dessert-spoonful; antimonial wine 20 drops; mix for a dose, to be taken in a little warm tea on going to bed. Another—Laudanum 30 drops, vinegar and honey, of each a dessert-spoonful, ipecacuanha wine 25 drops; mix for one dose, as last. Another: milk of almonds 4 oz., sirup of squills and tolu, of each, 1 oz.; mix. A tablespoonful every two hours.

Furs may be preserved from moths and insects by placing a little colocynth pulp (bitter apples), or spices—as cloves, pimento, etc.—wrapped in muslin among them; or they may be washed in a very weak solution of corrosive sublimate in warm water, 10 or 15 grains to the pint, and afterwards carefully dried. Furs, as well as every other species of clothing, should be kept in a clean dry place.

Portable Lemonade.—Tartaric or citric acid, 1 oz.,

finely-powdered loaf sugar ½ lb., essence of lemon 20 drops; mix; 2 or three spoonsful make a very pleasant glass of extemporaneous lemonade. Another—Powdered sugar 4 lbs.; citric or tartaric acid 1 oz.; essence of lemon 2 dr.; mix well. As last. Very sweet and agreeable.

Tinning.—Plates or vessels of brass or copper, boiled with a solution of stannate of potassa, mixed with turnings of tin, become, in the course of a few minutes, covered with a firmly attached layer of pure tin. A similar effect is produced by boiling the articles with tin filings and caustic alkali, or cream of tartar. In the above way, chemical vessels made of copper or brass may be easily and perfectly tinned.

New Tinning Process.—The articles to be tinned are first covered with dilute sulphuric acid, and when quite clean in warm water, then dipped in a solution of muriatic acid, copper and zinc, and then plunged into a tin bath to which a small quantity of zinc has been added. When the tinning is finished, the articles are taken out and plunged into boiling water. The operation is completed by placing them in a very warm sand bath. This last process softens the iron.

Kustitien's Metal for Tinning.—Malleable iron 1 lb., heat to whiteness; add 5 ounces regulus of antimony, and Molucca tin 24 pounds.

The Water Supply of London.

A London weekly paper says:—Three of the great water companies extend their suction pipes of supply as far as Hampton. Miles and miles into the country we may see great mains a yard in diameter, dipping under the Thames, crossing the deep ditches, and passing along the fields and furzy commons, at certain points intercommunicating with each other, in case either may require temporary help. The far off source is little dreamed of by the thirsty soul, who quaffs from the drinking fountain in the crowded street.

He little fancies that he is sucking from a stream through ten miles of iron pipe, the end of which dips into the Thames close to Wolsey's pleasant palace. The great mains of all the companies are thirty-six inches in diameter, and it must be remembered that they are free and fully charged at all times, so that in case of fire the fireman has only to turn the plug to get any quantity of water he requires. In some cases—such as at the great fire in Tooley street—thousands of tons of water are thus abstracted gratuitously without interfering with the supply to the houses.

"At the beginning of the present century, the mains, indeed all the pipes, were wooden—the trunk of trees bored out—and in no case of more than one foot in diameter. How the metropolitan giant must have grown, the size of his present iron arteries is a proof. The mains of the eight water companies not only supply London proper, but push far out into the country, invading even the agricultural districts, and supplying its farms. They distribute in the aggregate upwards of 100,000,000 of gallons daily, through 30,000 houses and factories, through capillary pipes upwards of 7,000 miles in length.

If all the water daily used in this great city were collected in one great reservoir, it would cover seventy acres in extent and six feet in depth. As the spectator watched this great expanse of water, he would see it hour by hour drained to the bottom by the collective millions in the metropolis as calmly and noiselessly as a cup is drained by a dusty roadside traveler. The collective iron heart, the steam engines which propel this flood, possesses a force of not less than nine thousand horses.

The Art of Agriculture.

The art of agriculture consists in three things—in keeping the soil rich, light, and free from weeds. If this is done any plant will grow vigorously, if it is not done, no plant will grow.

IN MAN, there is but 6 ounces' weight of stomach to 100 lbs. of body, which is one reason why our food must be in a concentrated form, and why, although the potato or other vegetables may keep us in good flesh, yet to sustain the energies of the system, particularly for those who do the most labor, the greater concentration of a meat diet is absolutely essential.

Correspondence

Rollers Under Slide Valves.

MESSRS. EDITORS:—A remark on page 47 relating to the large engines for the new fast frigates, explaining that the valves have steel rollers under their bottoms and under their steam faces to relieve the friction, says with justice that rollers for this purpose would *seem* to be difficult to regulate so as to be beneficial. The apparent or real difficulties have defeated all efforts at improvements in this direction until quite recently.

There are now a large number of government and private vessels and a larger number of locomotives running with such rollers. They are arranged according to a patent issued to Richard C. Bristol, of Chicago (now residing temporarily in New York), dated Nov. 13, 1860. This engineer has with untiring zeal labored on successive improvements in this line since 1858, and deserves the credit of contributing very largely by these improvements to overcome what might otherwise have been fatal difficulties in our new-school war vessels.

The rollers in all cases are less than two inches in diameter. Under the largest valves they are each about 2½ inches in length and are packed closely together in three lines, one line under each side, and one along a bearing provided in the middle, with liberty in each case to travel back and forward a distance equal to half the greatest travel of the valve. The rollers which take the *weight* of the valve are slighter and of far less consequence. All are of hardened steel, and hardened steel ways are mounted on the valve and also on the cylinder face to support the stress. They are made at first to take very little or no strain, but are very accurately turned of uniform size. As the face of the valve and of the cylinder rapidly wears off under the great friction the rollers begin to support the load and ultimately take nearly the whole of it without inducing leakage.

The Reading Railroad and the Connecticut River Railroad have each had one or more locomotives thus provided upwards of a year. The New York and New Haven Railroad, the New York and Erie, the Chicago and Fort Wayne, Atlantic and Great Western, Michigan Central, Milwaukee and La Cross, and several other important lines of Railroad have more recently applied the same to some of their locomotives. There are many points of importance to be attended to in carrying out the idea, but they have been successfully mastered.

THOMAS D. STETSON.

New York, Jan. 20, 1865.

[The rollers under the bottom to carry the weight of the valve strike us as being quite as important as the others, for at that point two metallic surfaces of greater or less area, according to the size of the valve, would be in contact, creating immense friction and adding very much to the labor on the connections. The Government seems to doubt the efficiency of the rollers in the case of the frigates, for the engines to these ships have their valves balanced by other means in addition to the rollers.—EDS.

New York Milk Business.

The milk received in New York comes to the city mostly by rail, and is brought from distances varying from ten to one hundred and fifty miles. The amounts received daily over the principal railroads are: Erie, 88,000 quarts; Harlem, 100,000 quarts; Hudson River, 16,000 quarts. To these amounts must be added 75,000 quarts produced by the city. Although many establishments sell nothing but undiluted milk, still old dealers are honest enough to say that to any calculation concerning the retail business, it is perfectly safe to add twenty per cent for water. The following prices show the increase of rates since 1842. In that year milk was retailed for four cents a quart. In 1854 the price increased to five cents; in 1857 to six cents; in 1862 to seven cents; in 1863 to eight cents, and is now selling for twelve cents. Some idea of the magnitude of the milk business may be gained from the fact that there are over four thousand persons engaged in its distribution in the city. A very spirited rivalry has sprung up between the retailers of milk in its crude form and those who condense it. Of the latter there are but three companies in the city; but the amount supplied by them is equal to the sale of at least ten companies dealing only in the crude article. It can be said generally that most companies engaged in the sale of milk have within the last five years sought to sustain an honest reputation by the sale of pure milk only.

MARKET FOR THE MONTH.

The great feature in the markets during the month of January was the great decline in gold, which fell at one time as low as 197. While gold is falling trade from first hands is almost wholly suspended, as jobbers are afraid that they will not be able to sell their goods at cost. On the 25th of the month gold had rallied a little, and prices of the leading staples compared with those at the close of December are as follows:—

	Price Dec. 29.	Price Jan. 25.
Coal (Anth.) ₩ 2,000 lb.	$9 50 @ 10 50	$12 00 @ 12 50
Coffee (Java) ₩ lb.	48½ @ 50	47 @ 48
Copper (Am. Ingot) ₩ lb.	48½ @ 49	45 @ 46½
Cotton (middling) ₩ lb.	1 14 @ 1 15	84 @ 85
Flour (State) ₩ bbl.	$9 45 @ 10 25	$9 20 @ 9 70
Wheat ₩ bush.	$2 12 @ 2 80	Nominal.
Hay ₩ 100 lb.	$1 50 @ 1 65	$1 50 @ 1 90
Hemp (Am. drs'd) ₩ tun.	340 00 @ 400 00	$320 00 @ 390 00
Hides (city slaughter) ₩ lb.	13 @ 13½	13 @ 13½
India-rubber ₩ lb.	70 @ 1 20	72 @ 1 20
Lead (Am.) ₩ 100 lb.	15 00	13 00
Nails ₩ 100 lb.	$8 50 @ 9 00	8 50 @ 9 00
Petroleum (crude) ₩ gal.	50½ @ 51	45 @ 45½
Beef (mess) ₩ bbl.	$19 00 @ 24 00	19 00 @ 24 00
Saltpeter ₩ lb.	30	30
Steel (Am. cast) ₩ lb.	19 @ 34	19 @ 34
Sugar (brown) ₩ lb.	16½ @ 25	16 @ 22
Wool (American Saxony fleece) ₩ lb.	90 @ 1 10	90 @ 1 10
Zinc ₩ lb.	18 @ 19	18 @ 19
Gold	2 24	2 05

Internal Revenue from New York City.

Besides the duties on imports paid by the City of New York, the entire receipts of the National Government here, from ordinary collections, which to the end of December were $27,000,000, and from stamps and special collections about $7,000,000 more, foot up $34,000,000.

The internal revenue estimates for the ensuing year, including $30,000,000 from the Assessors' lists, are $36,000,000. Good judges believe that the aggregate sum which will be returned to the close of the year will not be less than $40,000,000.

RECAPITULATION.

Receipts from Collectors of Internal Revenue in New York to Dec. 1, 1864	$27,000,000
Receipts from sales of revenue stamps	6,000,000
Receipts from banks, insurance companies, and other sources	1,000,000
Total internal revenue in two years and three months in New York	$34,000,000
Estimates for 1865.	
Receipts from Collectors of Revenue	$30,000,000
Receipts from sales of revenue stamps	5,000,000
Receipts from banks and other sources	1,000,000
Total estimate of internal revenue in New York from Jan. 1 to Dec. 1, 1865	$36,000,000

Newspaper Agency Business.

As an interesting item of news, and in order that our readers may have some idea of the enormous business done in this city, at the present time, by newspaper agents, we will mention the fact that the cash receipts of the American News Company for the eleven months ending with the 31st of December last, reached the sum of $2,226,872 83. Within that time forty millions of newspapers alone were handled and packed by persons in the employ of the company. Beside newspapers there were shipped to agents in various sections of the States a vast number of magazines, books, stationery, etc. For wrapping paper and twine with which to pack this vast mass of literary matter the company paid twelve thousand dollars. This is the business of one news agency alone. Ten years ago, in 1854, the total sales abroad by newspaper, book and periodical agency in this city did not exceed three-quarters of a million of dollars. These results are most gratifying, as they assure us that intelligence keeps pace with population, and that the general prosperity of the people has not been checked materially by the insurrection now raging in the slave states.

BINDING.—Those of our subscribers who wish to preserve their numbers of the SCIENTIFIC AMERICAN for future reference, can have them substantially bound in heavy board sides, covered with marbled paper, and leather backs and tips, for $1,00 per volume.

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:—

Pulverizer.—This invention consists in a novel construction and arrangement of a rotary cutter or pulverizer, whereby the same is made to operate in the most efficient manner, and to overcome difficulties attending the rotary cutters hitherto used for pulverizing the soil. The invention also consists in a novel construction of a traction drum, on which the frame of the machine is mounted, whereby said drum is prevented from becoming smooth and inefficient by the adhesion of earth to it. The invention further consists in a novel application of caster wheels to the machine, whereby the same may be adjusted with the greatest facility, for the purpose of rendering the pulverizer operative or inoperative, as may be desired. Lemuel S. Fithian, of Absecom, N. J. (assignor to himself and John Young, of Joliet, Ill.), is the inventor

Millstone Pick.—This invention relates to a new and improved millstone pick of that class which are constructed of thin steel plates, and are fitted or secured in metal heads secured to a handle. The object of the invention is to obtain a simple and efficient means for securing the pick blades in the metal head, and one which will admit of the frame being readily adjusted, to compensate for grinding or wear, and which will also admit of the pick blade being readily removed from the head when necessary. Lemuel C. Stone, of Kingston, N. Y., is the inventor.

Cut-off.—This invention consists in the employment or use of a squirrel cam, applied in combination with the governor and with the main valve and cut-off valve of a steam engine, in such a manner that by the action of the cam on the rod of the cut-off valve the steam is cut off instantaneously, or nearly so, and the wire drawing of the steam is avoided; and, furthermore, the cam being in action only for a short space of time, leaves the governor free during the largest part of the stroke. It consists, further, in the application of a latch and sliding pin, in combination with the rods of the main valve and of the cut-off valve, and with a suitable cam, in such a manner that by the action of the latch the main and cut-off valves are locked open, leaving no liability to close the ports until the proper time arrives, and by the action of the ram and pin the two valves are disconnected instantaneously, allowing them to move in the same or in opposite directions, as occasion may require. J. H. Paine, of Hartford, Conn., is the inventor.

Hook and Eye.—The common hook and eye are very likely to become unfastened in case of any relaxation of the tension of the garment produced by the movements of the body or by other causes. Many modes of preventing this have been invented, but all have been more or less objectionable, on account of their making the hook and eye more complicated and more difficult to manufacture. The object of this invention is to make the fastening secure without making the hook and eye any more complicated, or increasing its cost, and to this end it consists in the combination of a bill broader than the bent portion of the hook, and an opening in the eye narrower than the bill of the hook, which prevents the withdrawal of the bill without bringing the hook to an oblique position relatively to the eye. J. P. Culver, of New York City, is the inventor.

English and American Coal Trains.—The *London Railway News*, in an article on the coal trade on the London and Northwestern Railroad, says:—"An ordinary load for one locomotive is thirty-five trucks, but even that immense weight is sometimes exceeded." Now, as a truck, according to the same authority, "holds between six and eight tuns of coal," it follows that thirty five trucks of eight tuns each make 280 tuns a maximum English load.

On the Philadelphia and Reading Railroad, last year, the loaded trains averaged 576 tuns of coal, or more than twice the number of tuns in a maximum train on the London and the Northwestern Railroad. The newer engines on the Philadelphia and Reading Railroad draw 150 cars containing about five tuns each, or nearly 750 tuns of coal on freight.

Admiral Porter's Report on the Monitors.

We extract from this officer's report such portions as relate to the monitor iron-clad batteries:—

"My late experience with the monitor class of vessels under fire at sea and in riding out heavy gales, justifies me in making a special report in the matter. I feel the importance of the Government's receiving accurate information in relation to a class of vessels about which there has been a difference of opinion, and of which we are building quite a number.

"My experience has been with the *Monadnock Saugus, Mahopac* and *Canonicus*, all vessels of some difference of construction, and built, I believe, by different contractors.

"The *Canonicus, Mahopac* and *Monadnock* left Hampton Roads on the 18th ult. The weather was quite rough, and at times the sea would go over the turrets and down the funnels; but I passed them while at sea, and they were making excellent weather of it. On asking their Commander afterward, how they got along, the answer was, 'Oh, quite well, sir; only a little damp.'

"The *Monadnock* is capable of crossing the ocean alone, (when her compasses are once adjusted properly,) and could destroy any vessel in the French or British navy, lay their towns under contribution, and return again, (provided she could pick up coal), without fear of being followed.

"On the 21st ultimo, it came on to blow hard from the southwest, and a very heavy sea commenced rolling in. The vessels are all anchored in thirteen (13) fathoms water, with a long scope of chain out. Most of the vessels dragged during the gale. The *Tuscarora* and *Juniata* put to sea (I think unnecessarily), while the monitors rode out beautifully. I was anchored quite near them, and witnessed their performances. I at first thought I had been imprudent and had unnecessarily risked the lives of officers and men, but I went to sleep the first night of the gale quite easy in my mind in regard to the monitors.

"I saw that they were making the best weather, and riding easier than any of the other vessels in the fleet. All the transports cut and ran, though I think that was quite unnecessary. After the gale I inquired of the Commanders of the monitors how they passed through the ordeal, and they seemed to think they got along very well. The smaller monitors, *Mahopac* and *Canonicus*, at times almost disappeared from view, and the Commander of the former vessel complained of discomfort, owing to the decks leaking, but the vessels were in no danger at the time.

"The Commanders of the monitors seem to feel quite at home and safe in them, and apprehend no more danger at sea than in any other kind of vessel. Commander Parrott, of the *Monadnock*, remarked he did not see any difference between her and anything else. The *Saugus* joined me after the first day's fight, off Fort Fisher, and was towed round from Norfolk by the *Nereus*, in very rough weather. The vessel leaked a good deal through her bows, and some uneasiness was felt for her on that account; but her seagoing qualities were spoken of as good. The difficulty was a mechanical one, and in no way detracts from the qualities of the vessel. There is no great amount of comfort on board these vessels at sea; that is conceded on all sides, but they are seldom at sea, and only exposed when making a voyage. This is the first time, I believe, that the monitors have ridden out heavy gales, in an open sea at anchor, though they have ridden out gales in Charleston Roads."

Destruction of the Smithsonian Institute by Fire.

On Jan. 25th, the magnificent structure known as the Smithsonian Institute, at Washington, was destroyed by fire. The *Intelligencer* thus speaks of the catastrophe:—

"The fire originated in the loft above the picture gallery. Workmen had been engaged there in hanging pictures, and the room being cold, they put up a stove, and, it is supposed, ran the pipe into a defective flue, and thus caused the fire. The fire spread rapidly and soon the roof of the lecture room fell, driving out the firemen who were endeavoring to confine the flames to the picture gallery. The fire spread to other portions of the building. It was deemed prudent to remove the furniture from the east wing, occupied by Prof. Henry as a private residence, and also the stuffed birds and preparations from the taxidermist's rooms; but in the haste and from the narrowness of the passages much damage was done to the property so removed.

The library in the west wing and the residence of Prof. Henry in the east wing will be saved from the ravages of the flames. The museum on the lower floor is also safe, for the floor between it and the upper rooms is of brick and constructed so as to be fire proof.

The instruments and apparatus in the east wing were worth at least $10,000, and it is not yet known how many were saved.

Apparatus of Historic Interest Destroyed by the Recent Fire.

Among the articles destroyed by the disastrous fire at the Smithsonian Institute were all the chemical apparatus presented by Prof. Hare, a large magneto-electric machine, an electro-magnet, and set of apparatus illustrating the discovery of the vibration of Trevelyan's bars by galvanism, presented by Prof. Page. The magneto-electric machine was of peculiar construction, a full description of which is given in Vail's work on the American telegraph. Noticing its performances the author says;—"This machine operated Morse's telegraph in 1844 through 80 miles of circuit, makes an electro-magnet sustain 1000 pounds, and melts a platinum wire one-tortieth of an inch diameter."

Sir Wm. Armstrong's Present to Jeff Davis.

Among the many trophies captured at Fort Fisher was an Armstrong gun presented by the manufacturer, Sir William Armstrong, to Jeff Davis.

A soldier describing it says, "it is by all odds the handsomest gun I ever saw, being entirely of twist wrought iron, and mounted on a magnificent solid mahogany carriage."

Such a present is eminently characteristic of Sir William, who believes that all patent laws for protecting inventors' rights should be abolished. He thinks, probably, that one of his guns in the hands of Davis would not only contribute to kill Yankees, but would also aid towards destroying the patent laws.

American Nails in the British Provinces.

The *Iron Trade Circular*, of Birmingham, remarks:—"A hint to nailmakers reaches us from Vancouver and British Columbia, in a letter which says:—'I trust that the nail manufacturers have made some provision to remedy the defect I pointed out previously; for as new towns are continually springing up here, all of which are built of wood, fastened together with nails, a large and interesting trade exists; but so inferior are the English-made nails, that no carpenter will undertake any contract without being provided with American nails.'"

The Best Time to Prune Trees.—At the last meeting of the Farmers' Club there was a long discussion on pruning trees, by Dr. Ward, and Messrs. Ely, Carpenter, and Smith, and they agreed in opinion, as the result of their experience, that the best time for pruning is the summer when the trees are growing Trees pruned at that time heal more readily, and are less likely to be attacked by black blast, or otherwise injured, than if pruned in the winter.

Drilling Upward.—A machine has been invented in England for boring upward from tunnels, for the purpose of ventilating mines. We have not seen the machine, but it is described as working much the same way as augers used in bering salt and oil wells. The auger is spliced as the work progresses, and as the boring is upward there is no trouble about clearing the hole of chips, as they drop down as fast as made.

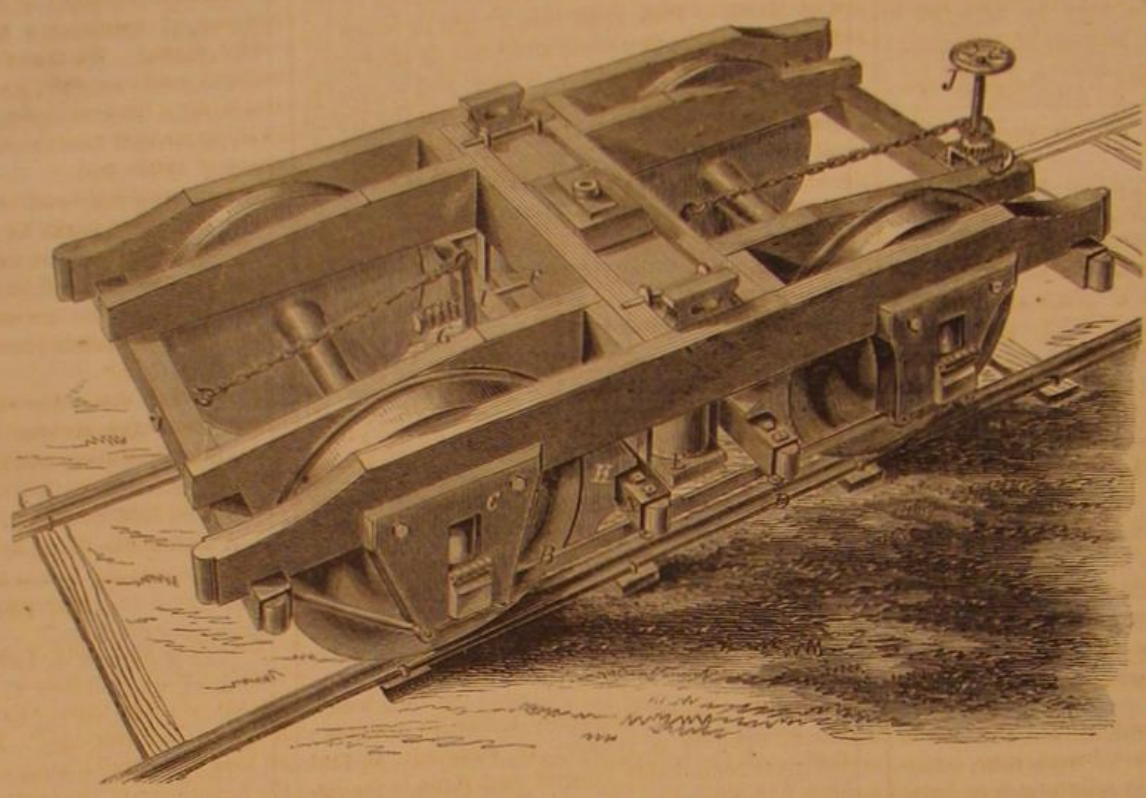
Ornamenting Iron and Steel.—Mr. Christian Weintraud, jun., of Offenbach, Hesse Darmstadt, has patented an invention, which consists in ornamenting, by drawing or otherwise marking on the surface of steel or wrought-iron, which must be first polished or bright, or "matted," any desired spots, pattern, or device, with boracic acid. The metal is then fired, and according to different temperatures so will the effects differ.

Improved Car Truck and Brakes.

Brakes, as ordinarily applied to railway car trucks, are a source of danger, for not unfrequently the sustaining irons break and let the beams down on the track, endangering the security of the train and passengers. In this improved railroad truck such disasters cannot occur, for even if the stirrup irons, supporting the brake beams from the car frame above, are entirely removed, the brakes themselves cannot drop down, as in the ordinary truck. Additional security is given the brakes by prolonging the ends of the beams, A, and affixing an iron bar, B, between the two pedestals, C, so that the beam ends rest upon it. There are also iron straps, D, in the ends of the beams, through which the bar, B, passes, thus preventing the beams from sliding endwise should they be broken in the middle. In the center of this truck frame there is a stout timber, E, over which rods, F, provided with springs, G, pass There is one of these rods at each end of the truck, and they also serve to sustain the brake beams, while the springs, G, keep the brake blocks, H, off the wheel, so that they are out of contact except when in actual use.

The application of the brakes, or retarding power, to these trucks, puts the train under perfect control. Two levers, I, are used, and the hand wheel, J, is connected with one, while to the other a stationary chain, K, is fastened, which holds it to the truck frame. These two levers are also tied rigidly together at the bottom, under the beam, by an iron rod, so that when strain is applied to the first lever it will be communicated to the other by the rod before-mentioned, and both sets of brakes will be forced up against the wheels.

This brake was invented by W. G. Goodnow, and assigned to Goodnow & Wood, through the Scientific American Patent Agency, on October 18, 1864. For further information address D. S. Wood, Albany, N. Y.



GOODNOW'S CAR TRUCK AND BRAKES.

EMPLOYMENT FOR DISABLED SOLDIERS.

It is to be regretted that full and accurate records have not been kept by the Government respecting soldiers and sailors discharged for disability during the war. The authorities have been lax in this particular. The system which was well adapted to our regular army in time of peace falls far short of the requirements of a great volunteer army in active service. A Bureau of discharge established at Washington, St. Louis, Cincinnati, and New Orleans at which men sent from the front could be re-examined and through which candidates for discharge should be sifted, might have saved thousands of perfectly able bodied soldiers to the government, and at the same time furnished statistics of the most interesting and useful nature.

Although we have really no means of determining the number of men who have lost arms or legs, or suffered other injuries in battle, or even the number discharged by means of wounds, the fact that numbers have thus suffered and become unfit for future service and for ordinary employments, becomes more and more apparent. Col. Nott, who is acting as Secretary of the new "Bureau of Employment for Disabled and Discharged Soldiers and Sailors," at 35 Chambers street, gives us some data which future observations may confirm or modify. It appears that of the first two hundred applicants for employment registered at the Bureau, 63 per cent were discharged for wounds, 31 per cent on account of other disabilities and 6 per cent on the expiration of their terms of service. It also appears that 16 per cent of all the applicants have lost an arm, and 15 per cent have lost a leg, and nearly every trade seems to be represented among them.

A main noticeable feature is the small proportion of men "fit for service." It indicates very clearly that nearly all of our veterans who are not disabled re-enter the service. The next fact is the large proportion of men who have lost the use of arms or legs. Thirty-one per cent of all the applicants (in effect one-third) are of those permanently disabled groups. A new class of laborers is, therefore, to be provided for in one of two ways:—either by giving them work, or by charity.

We cannot consent to make paupers of our soldiers; of all others they are the first who deserve well of the country. Whatever employment is adapted to their condition should be set apart for them. It is indisputable that thousands of able bodied men are employed on work which should be transferred to the disabled. The Government offices, Navy Yards and Custom Houses can give permanent occupation to large numbers of these men as clerks, book-keepers, messengers, letter carriers, watchmen, &c. The action of the Government and the efforts of every individual employer are needed to co-operate in this field of furnishing employment to disabled soldiers.

CHITTENDEN'S HORSESHOE.

Very many horses have been maimed for life by the carelessness of farriers. Sometimes the evil is



caused by misfitting shoes, or by driving the nails in too far. In either case the result is the same, and severe losses have been the result of the mischief referred to. There is another feature about a shoe which is permanently attached to the horse's hoof. Humanitarians have urged that it is no more reasonable that a horse should retain his *stiff, unyielding* shoes, after a hard day's work, than his master, and that where the latter doffs his heavy traveling boots, the beast should have the same privilege, and the shoes *ought to be removed* when his day's work is done. It is argued in favor of this course that the comfort of the animal is not the only consideration, for, if the animal stood in his "bare feet," the floor of the stall would be preserved from injury, and wear much longer than when sharp iron came in contact with it; also that *the shoe itself* would be more durable, because it would not be worn except when in actual duty. By the disposition of the several parts of the shoe here shown, which is intended to be removed at will by any person, the hoof is preserved from injury, and diseases of that member prevented, by keeping them in a state of nature, or free from the boring, burning and cutting incidental to the present system of shoeing horses.

Whether these conditions are all obtained is more than we can say. The shoe shown is simple in construction and adjustment, and seems likely to fulfill the ends required of an article of this character.

In detail, it is a common shoe, A, with a strong metallic shield, B, at the front and rear. This is fitted to the hoof, and the whole is then retained in place by the metallic bands, C, one end of each fitting over a button, D, which holds them both in place, or allows the shoe to be taken off by simply turning the button on one side.

This horseshoe is the invention of Morgan Chittenden, of Danbury, Conn., and was patented on the 17th of October, 1864. For further information address him as above.

Revived Corks.

The attention of the French public has been called by M. Stanislaus Martin to the employment of refuse corks as dangerous to public health. It is the custom of the Paris scavengers to collect those which are brought down by the sewers, and sell them to persons who make it their business to revive them. If the corks are of unsightly shape they are recut; while, if containing holes, they are filled up with mastic, and then smeared with powder to give them a proper color. Such corks used only to be employed by the ink and blacking makers, but their low price (5s. 6d. per 1000) has of late induced retailers of bottled beverages to purchase them. Some of these corks may have been formerly used to stop bottles containing poisonous substances; for although a good cork is not permeable, a bad one, full of holes, may readily become the receptacle of particles of verdigris, carbonate of lead, arsenic, or an infinity of other poisonous substances, which may be more or less soluble in water, wine, beer, cider, vinegar, milk, or oil.—*London Grocer.*

Marine Railway around Niagara Falls.

Mr. Horace H. Day, the famous India-rubber manufacturer—now retired from that business, has shown us a plan which has been inaugurated by him for transporting vessels around the falls of Niagara on the American side. It is designed to place vessels with their cargoes in a portable lock filled with water, which is to be drawn by locomotives upon numerous rails.

The maximum grade is 120 feet to the mile, and the estimated cost is three and a half millions of dollars.

THE

Scientific American.

MUNN & COMPANY, Editors & Proprietors.

PUBLISHED WEEKLY AT

NO. 37 PARK ROW (PARK BUILDING), NEW YORK.

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

☞ "The American News Company," Agents, 121 Nassau street, New York.

☞ Messrs. Sampson Low, Son & Co., Booksellers, 47 Ludgate Hill, London, England, are the Agents to receive European subscriptions or advertisements for the SCIENTIFIC AMERICAN. Orders sent to them will be promptly attended to

VOL. XII. NO. 6....[NEW SERIES.]....*Twentieth Year.*

NEW YORK, SATURDAY, FEBRUARY 4, 1865.

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AMENDMENT TO THE PATENT LAWS.—IMPORTANT TO PATENTEES.

The editorial letter from Washington published in our last number refers to an amendment now pending before Congress, designed to relieve a very large number of inventors who have failed to pay the balance of the patent fee—twenty dollars—within the six months as provided by law, thereby forfeiting their rights.

The language of the act of March 3, 1863, which requires payment of the balance fee within the six months after date of allowance, is peculiar. It provides that in default of said payment the invention shall become *public property as against the applicant.* The public acquire no rights in the invention as against another and subsequent inventor, leaving the original and first applicant only to suffer the consequences of not having paid the second fee within the time specified.

The rule of the Patent Office treats all such lapsed patents as judicially dead upon the record, and examiners are not allowed to refer to them under any circumstances, even though an application be made by another inventor for the same thing. Though this rule may be correct as based upon the language of the law of March 3, 1863, it nevertheless contravenes the plain intention of the statute of 1836, which requires that patents can issue only to the original and first inventor of the art, machine, composition or improvement. The same statute provides that whenever, in the Commissioner's opinion, two pending applications are adjudged to interfere with each other, that officer shall declare an interference, and require testimony with a view to determine the question of priority as between the applicants.

The amendment of 1863, however, conflicts with the law of 1836, inasmuch as it shuts off from this interference the unfortunate first applicant who has not paid up within the six months. Many might hastily jump at the conclusion that it would be serving an inventor right who thus failed to comply with the inexorable demands of the law; but we think no unprejudiced mind will thus reason, when a fair statement of the case is presented.

If an inventor wilfully neglect his duty as prescribed by the law, he is entitled to no sympathy, and ought not to ask for it; but the records of the Patent Office show most conclusively that there are hundreds of cases in which the applicant could not comply with the law. Many inventors justly plead inability to make the payment in time; some are entirely ignorant of the law on the subject, and for want of such information do not pay up in time; but it bears with peculiar hardship upon persons residing in foreign countries and upon those who are engaged in the military and naval service of the country. Inventors of this class are subject to all the changes and vicissitudes of the service, and are rarely ever stationed for a long time in one position.

There are many very aggravating cases, involving the interests of our brave soldiers, which appeal with great force for such relief as will be afforded to them by the bill now pending before Congress.

The act in question provides that an applicant whose patent has elapsed under the operation of the law of March 3, 1863, shall have a right to renew his application within two years after date of allowance, upon the payment of fifteen dollars, and to use the papers and model originally presented to the Patent Office. This we regard as a fair and equitable treatment of all such cases, and we trust that it will meet the approbation of Congress.

The bill has been carefully considered in all its bearings, and has received the unqualified sanction of the Hon. Commissioner of Patents. It now only awaits the action of Congress to become a law of relief. It is vastly important, however, that it should pass at this session in order to allow all such cases to be included within its provisions. If it be put over till the next Congress the term of two years, as provided in the bill for the renewal of applications, will have expired before favorable action can be had.

Inventors who are suffering under the operation of this law of limitation ought to write to their members of Congress to look after the bill, and not allow it to slumber for want of attention.

ARE BANK DEPOSITS CURRENCY?

Hunt's Merchants' Magazine, under its new management, exhibits a mastery of economic science which gives remarkable interest and force to its discussion of financial questions. In the last number is an article on The National Finances, by Hon. Amasa Walker, the several positions of which seem to us sound, with one exception. This is embraced in the sentence, "The bank currency of the nation, at the present time, reckoning the circulation at $250,000,000, and the deposits at $450,000,000, is $700,000,000."

The currency or money of this country at the present time is of two kinds. In the States lying on the Pacific it consists of flat disks of two metals, gold and silver. In the remainder of the country it is a mixture of metallic disks and notes, the metal being an alloy of copper and nickel, and the notes being partly those of the United States Government, and partly those of certain joint stock companies or associations of individuals, called banks. The managers of these companies have succeeded in so establishing their credit, that their notes are received by people in exchange for the most valuable property, and have finally come into use as money. This same credit induces people who have money on hand which they do not intend to use immediately, to leave it with some bank for safe-keeping. If the banks kept these deposits on hand in the form of money, it would be a portion of the currency of the country; but this is not the case.

Deposits are usually made with banks in the first instance in the form of notes. One trader sells to another $1,000 worth of merchandise on six months credit, the purchaser giving his note for the amount. The seller sends his note to the bank for discount; the interest is deducted, and the remainder is carried to the trader's credit as a deposit.

If the trader now buys goods for cash, he draws his check for the amount; the seller of these goods sends the check to his bank, where it is entered to his credit as a deposit, and after its passage through the clearing house it is charged to the drawer, diminishing his deposits to the same extent. This is the ordinary course of business.

It will be seen that bank deposits are simply ledger balances, being the records of the transfer and ownership of merchandise. There is no more propriety in calling them currency, than there is in calling a barrel of pork, currency.

If a bank has on hand any notes of other banks, thore notes are money, or currency. But they are part of the circulation, and are included in the $250,000,000.

CORN HUSK FOR PAPER STOCK.

We are informed that the process for making paper from corn husks, of which so much has been said in the SCIENTIFIC AMERICAN, is about to be tried here on an extensive scale in a short time. If successful, printing paper especially is to be largely manufactured.

Corn husks have doubtless been fed out to cattle universally this winter, but expensive as hay is it is questionable economy to do so now when there is a prospect of obtaining a high price for the husks before spring. We therefore suggest that our agricultural readers carefully husband their stock of this staple, for a time at least, as the demand for it is likely to make it much more valuable than it is in the shape of cattle feed.

We sincerely hope and believe that the preliminary trials with corn husks for paper stock will prove to be what it has been represented, and further, that energetic measures will be taken to put the manufacture in market, for newspaper publishers have no heavier tax in their business than the price of printing paper.

It is stated that proprietors of the leading papers in this city have secured the right to make paper from this substance, and farmers are requested to address D. A. Craig, General Agent of the Associated Press, New York City, in reference to any quantity of corn husks they may have to dispose of.

HOT BEARINGS.

Detention and delay of steam vessels by hot bearings is not an uncommon occurrence. We read in reports of trial trips "the ship was delayed some hours by hot bearings." These few words convey no idea to the uninitiated, of the engineer's anxiety, the impatience of the captain and sailing officers on such occasions. There are some screw steamers out of this port which have an inch and a half stream of water constantly running on the main shaft-bearing. Such nastiness as this creates is beyond expression. Those who go below in the performance of their duties are agreeably (!) surprised by warm jets of greasy spray, and besmeared from head to foot. The bilge pumps are forever going, or the bilge injection is kept wide open to free the ship from the water. No lubrication takes place, for the oil is washed out as fast as it is poured in, and the main bearing has little more oil than the stern bearing, which runs under water.

Aside from faults of design which are often the sole cause, there are others which relate to mere manipulation or adjustment which may be here alluded to. Bearings often heat from being what is technically called "collar bound," or so tight sidewise that there is no motion.

Paddle wheel steamers rolling in a sea-way invariably heat and cut at the collars when the brasses are tighter at the point designated. When cutting once begins the fine metal abraded gets in and tears up the whole surface, rendering it hot in a short time. Badly fitted boxes also heat quickly. There will always be one part of the bearing where the chief work is done. A horizontal engine bearing wears chiefly at the sides, and chocks are provided for the purpose of taking the brasses up at these points. Vertical engine bearings wear at the bottom and top, and the labor is always in the direction of the stroke of the piston. Thus the brasses and bearings are continually wearing oval, or out of rotundity, and have to be chipped off to bring them down. When heating is not caused by defective adjustment, and is simply a fault of design, it is often of advantage to "doctor" the lubricant, and for this purpose blacklead and oil are useful. Sulphur and oil are also employed, and many engineers advocate the use of soapstone finely pulverized. Blacklead and tallow is also used for heavy bearings. All of these mixtures are nasty, and are chiefly valuable for their heavy body. Sulphur possesses no refrigerating power on a hot shaft, whatever it may do to the human body Blacklead has a certain smoothness which is valuable, and there is virtue in tallow. There is still an-

other agent which has good qualities but it is rather dangerous to use indiscriminately. Quicksilver possesses the quality of imparting a smooth, greasy gloss to the roughest bearings. We have seen badly cut shafts very much inproved by the use of quicksilver; so that although the ruts still remained they were silvered over, and the bearing was as good as new. On brass boxes, however, this substance should be used with great circumspection, for it forms an amalgam, or combines, so that the brass is rendered softer at the surface, and is quickly worn away. Steamers that race sometimes use mercury freely in their bearings, though the bad effects that follow are not apparent until some time after.

A shaft that is too slack in its box will heat; this may occur from the violent and sudden contact of the two parts which causes the metals to come in contact without the intervention of oil. It very often happens that all adjustment is in vain; that all the doctoring and cold water that can be applied are useless. In such cases it is advisable to change the composition of the brass box, by substituting a harder or softer one as the case may be.

The heating of a brass or bearing is a sure sign that there is some defect which ought to be remedied. Unequal expansion of the engine framing causes it, as well as being keyed too tightly. Experiments made by a French engineer proved that up to 6000 pounds on the square inch no heating took place provided the bearing was well oiled and in line. The number of square inches in a large bearing give a very great sum total in pounds on the whole surface and when heating occurs it detracts seriously from the power of the engine.

INVENTION PERPETUAL.

There is a moral grandeur in the progress of invention which strikes a reflecting person forcibly. The spectacle of the weekly departure of models from this office, to be forwarded to Washington, is one of great interest. It is not merely the presence of a hundred or more inanimate machines, mere ingenious combinations, which causes these sensations; but the fact that through them the material interests of society are very greatly enhanced.

It would be puerile to represent every inventor solely as a public benefactor, with no thought beyond the welfare of mankind in general. Invention with most persons is a calling through which they get food and raiment; but those who originate and carry out useful improvements are accessories after the fact, in legal phrase, and as much entitled to public respect and remembrance as the greatest philanthropist.

It is related that a clown once stood beside a rapid stream, patiently waiting until the water had run out, so that he might pass over dry shod. If this traditionary personage should visit this office in the flesh he might stand agape with wonder and wait in vain until the shelves were bare of inventions; he might linger tediously while the expressmen bore in their parcels, in the hope that they would come no more; he might shuffle from one foot to the other, in the vain expection that ere long these inventors would cease bothering his sight with the long train of their ideas in tangible forms. So long as the river runs will the inventions come forth. So long as man is man his mind will be busy, and there will be no stop or check in the improvements he devises.

In the summer time, or in harvest, with the falling of the leaf or the budding of it, all is the same, and instead of growing less there is an appreciable increase in the number of applications for patents. It is well that this is the fact, for by the exertions of the class in question hundreds have been added to our army, to our navy, to the field, the factory and the store.

DRY PRINTING.

We mentioned last week, in our editorial correspondence from Washington, that some eighty hydrostatic presses are employed in printing the fractional currency. On the 19th inst. there was a discussion on the subject in the House of Representatives, when Mr. Garfield made the following remarks:

"In regard to the dry-plate printing, to which the gentleman has referred, the committee did report that the machinery was very heavy and expensive, that the experiment had not yet been completed, and that they could not recommend the system on the score of economy. It seemed to us to be an expensive experiment and one of doubtful success. But since that time the experiment has proved highly successful. I think there can scarcely be found an instance of so marked a success in any branch of mechanical ingenuity as this experiment in dry-plate printing. If the gentleman will visit the Treasury Department he will find that printing is there executed far faster by this method than by the old method; and not only faster, but far better. The printing is executed in such a way as to afford almost an absolute security against counterfeiting. Within the past few months one of the most accomplished engineers of England has visited the printing establishment of the Treasury Department, and he declares the printing machinery now in use there to be a master-piece of skill in mechanics. And I am informed to-day by a gentleman on this floor that Professor Agassiz, who has witnessed the operation of that machinery within the past week, pronounces it one of the wonders of the age—one of the marvels of mechanical science."

In ordinary copper or steel plate printing the paper is moistened in order to soften it before it is laid on the plate. This renders necessary a drying and pressing process after the printing. The object of printing the paper dry is to save all subsequent manipulation, but to print it dry, very powerful pressure is required, and this is furnished by the hydraulic press.



ISSUED FROM THE UNITED STATES PATENT-OFFICE

FOR THE WEEK ENDING JANUARY 24, 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.

45,962.—Hoisting Machines.—Charles Abel, New York City:

I claim the construction and use of the worm wheel, D, with its connected wheel, E, and the worm screw, C, in combination with the pulley, A, substantially as and for the purpose described.

45,963.—Shutter Bolts.—Edward Andrews, Palo Alto, Pa.:

I claim the combination and arrangement of the bolt, B, the latch, D, lever, F, and spring, E and J, when used for the purpose herein fully described.

45,964.—Tapping Water Pipe.—Phineas Ball, Worcester, Mass.:

I claim, first, The combination of the clamping irons, H H', with the pipe, A, tap holder, D, and tap, c, substantially as and for the purpose described.

Second, The combination of the clamping iron, H, with tap holder, D, and tap, C, substantially as and for the purposes described.

Third, The combination of the packing, I, with pipe, A, tap holder, D, and tap, C, substantially as and for the purposes described.

45,965.—Horse-power Elevator and Excavator.—Stephen T. Bishop and Andrew Stevely, Fond du Lac, Wis.:

We claim, first, The combination of a tread horse-power, with an endless chain excavator and elevator, substantially as set forth.

Second, We claim the adjustable frame, E, or its equivalent, in combination with the tread horse-power frame, substantially as specified.

Third, We also claim the machine, constructed and arranged substantially as described.

45,966.—Horse-power Elevators and Excavators.—Stephen T. Bishop and Andrew Stevely, Fond du Lac, Wis.:

We claim, first, So constructing and arranging a horse-power elevator and excavator as to render the machine movable with the horse upon the same, substantially in the manner and for the purposes set forth.

Second, We also claim the above-described arrangement of the wheels, U and V, in combination with the two sets of wheels, R and S, substantially as specified.

45,967.—Horse-power Elevator and Excavator.—Stephen T. Bishop and Andrew Stevely, Fond du Lac, Wis.:

We claim, first, The combination of the hook, L, with the bars, I, and the endless chain, substantially as set forth.

Second, We claim the use of the bar, I, for attaching the hooks or buckets, or both, to the endless chain, substantially as described.

Third, We claim the arrangement of hooks upon one part of the bar, I, and at the same time putting a bucket or buckets upon the other part or end of the bar, substantially as described.

Fourth, We also claim the arrangement of the hooks and buckets alternately, upon successive bars, I, substantially in the manner and for the purpose set forth.

45,968.—Horse-power Elevator and Excavator.—Stephen T. Bishop and Andrew Stevely, Fond du Lac, Wis.:

We claim the adjustable frame, C, in combination with the horse power, substantially as set forth.

Second, We claim the arrangement of the ratchet wheels as shown in Figs. 1 and 3, in combination with the crank, N, and frame E, substantially in the manner and for the purposes set forth.

Third, We claim the combination of the ratchet wheels and crank, N, with the ratchet bar, Fig. 3, substantially in the manner and for the purposes described.

45,969.—Looms.—Wm. Breitenstein, New York City:

First, I claim the arrangement and construction of the sliding bars, C C', provided with suitable arms at their ends forming the shuttle holders, and operated in the manner and for the purpose substantially as set forth and described.

Second, I claim the construction of the shuttle holders, and the arrangement of the arm, m, operated by a spring, o, and acted upon by the lever, G or G', in the manner and for the purpose described.

Third, I claim the arrangement and combination with a shuttle holder of the shield plate, F, in the manner and for the purpose set forth.

Fourth, I claim the sliding bar, H, in combination with the levers, G G G' G', constructed and operated in the manner and for the purpose specified.

Fifth, I claim the arrangement of the hook levers, N N', with their springs, r r', attached to sliding bar, H, in combination with springs, s s', attached to the breast beam, B, and acted upon by the arms, p p', of the sliding bar, C C', for the purpose of operating said sliding bar, H, in the manner substantially as set forth and described.

45,970.—Stone Gatherer.—P. S. Brewster and C. M. Hines, Lime Hill, Pa.:

We claim the pivoted bar, C, provided with gathering fingers, c, and operated by means of the bail, H, levers, F, and rods, E G, substantially in the manner herein described.

Second, We claim the platform, E, in combination with the lock bar, A' a', spring, a2, and plate, D', when the whole are employed in conjunction with the gatherers, C c, in the manner and for the purposes explained.

Third, In combination with the gatherer, C c, we claim the rollers, B B, extending across the machine to raise the fingers over stones too large to be lifted by them, substantially as set forth.

45,971.—Corn Planter.—George Bunch, Grand River Township, Mo., and James A. Price, Breckenridge, Mo.:

I claim the sliding handle, I, and sliding bar, H, connected together and applied to the frame, A, and shaft, D, substantially as and for the purpose herein set forth.

[This invention relates to a new and improved corn planter, of that class in which the seed-dropping mechanism is operated manually by the driver while walking behind the machine and guiding the same.]

45,972.—Sewing Machines.—Caleb Cadwell, Waukegan, Ill.:

First, I claim the slide, E', having a groove, e', to actuate the pin, f', on the thread catcher, F f, which guides the thread around the shuttle, substantially as described.

Second, I claim the pivoted bar, P, for taking up the slack thread, when operating in combination with the flipper, P', and projection, k', in the manner herein set forth.

Third, I claim the tension device, Q2 Q4 Q5, and the pin, Q2, for the spool, all mounted upon the spindle, Q3, on the arm, D, so that they may be removed and replaced at will.

Fourth, I claim the adjustable block, h3, and circular block, H2, in combination with the notched aperture for imparting a variable movement to the feed surface, H, the whole being operated by means substantially as herein described.

Fifth, I claim the combination of the circular blocks, H7 H8, the former, H7, being moved vertically by turning on the latter, H8, so as to raise and lower the feed surface, in the manner and for the purpose set forth.

Sixth, I claim the thread-winding apparatus, R R1 R2 R3 r, operating in connection with a spring, S, whereby it is held down to work in connection with the driving wheel, B, or retained out of contact therewith, as stated.

45,973.—Means of Working Ship's Pumps.—Ansel Cain, Holyoke, Mass.:

I claim operating the pumping apparatus of a ship or vessel by means of an oscillating weight, in combination with the mechanism described, the whole arranged substantially as set forth.

45,974.—Duster for Brick Machines.—Cyrus Chambers, Jr., Philadelphia, Pa.:

First, I claim applying sand or dust to the surface of undried bricks, in a chamber in which those materials, or either of them, are kept in suspension by mechanical means.

Second, Passing bricks as they come from a brick machine through a box or chamber in which sand or dust are kept in suspension by mechanical means, substantially in the manner and for the purpose described.

Third, The use in a dusting apparatus of the cones, P, constructed and operating substantially as described for giving direction to currents of sand or dust, for the purpose specified.

45,975.—Railroad Car Brakes.—J. H. Champlin, Essex, Conn.:

I claim a friction block for railroad car brakes, formed from stone or its equivalent, combined with and made adjustable by means of the screws, a a, in the case, D and arranged to operate substantially in the manner and for the purpose specified.

45,976.—Combined Seed and Potato Planter.—Otis N. Chase, Boston, Mass. Ante-dated January 8, 1865:

First, I claim the combination and arrangement of the toggle lever, d, and the frames, A and C, with one or more plows, substantially as described.

Second, I claim the projections represented by the knives or hooks, f f, etc., in combination with the stripping slot, I, or its equivalent, substantially as described, for the purpose set forth.

Third, I claim the combination and arrangement of the springs, j j, inclined plane, g, and seed box, H, with the projections, as represented by the knives or hooks, f f, etc., substantially as described, for the purpose set forth.

45,977.—Material for the Manufacture of Buttons, Handles for Knives, and other purposes.—Lucius E. Chittenden, Washington, D. C.:

I claim the manufacture of the articles above named, and the use in whole or in part for such manufacture, of the interior or nacreous portion of the shells of the fresh-water molluscous animals of the United States and North and South America, substantially in the manner above described, or in any other, substantially the same, which will produce the internal result or effect.

45,978.—Leather-channeling Tool.—Elliott H. Crane Jonesville, Mich.:

I claim the combination of the adjustable gage, G, with the shank, A, substantially in the manner herein shown and described.

I also claim the combination of the block, C, and cutter, B, with the shank, A, substantially as herein shown and described.

I also claim the combination of the cutter, F, with the cutter, B, block, C, and shank, A, substantially as herein shown and described.

I also claim the combination of the gage, G, with the block, C, cutters, B F, and shank, A, substantially in the manner herein shown and described.

[The object of this invention is to facilitate the cutting of V-shaped channels upon the edges of harness straps, boot and shoe soles, and upon all kinds of leather articles where channeling is required. The inventor calls it the "Improved Universal Channeler," because it can be readily adjusted so as to cut channels on different lines. It is a good improvement.]

45,979.—Hooks and Eyes.—John P. Culver, New York City:

I claim a hook and eye, combining the widening, e, of the bill of the hook with the narrower opening, b, of the eye, substantially as and for the purpose herein specified.

45,980.—Method of Attaching Handles to Cross-cut Saws.—Charles Disston, Philadelphia, Pa.:

First, The handle, A, its forul, c, and strips, b, the key, F, and self-adjusting plate, D, the whole being constructed and arranged for attachment to the end of the saw, substantially as described.

Second, The self-adjusting plate, D, hung to the strips, b and having projections, e e, adapted to notches in the edge of the saw, all as set forth

45,981.—Scroll Saws.—Wm. H. Doane, Cincinnati, Ohio:

First, I claim the combination of the devices A B C a b, the same

being adapted for and constituting a portion of a scroll sawing machine or sawmill, substantially as herein set forth.

Second, The combination of the tubular sleeve, C, key, c, screw, d, recessed or tubular shank, e, and guide stock, D, substantially as and for the purpose set forth.

Third, A tubular foot stock, D, with a guide holder, D', on its lower end, the said holder being constructed and having guides fitted upon it, substantially as and for the purpose set forth.

Fourth, The combination of the tubular sleeve, C, the stock, D, feather, e, and set screw, d, substantially in the manner and for the purpose described.

Fifth, The employment of a door, E, or its equivalent, in combination with a foot stock, D D', substantially as and for the purpose described.

45,982.—Joining and Fitting Corners of Soap-stone Stoves.—Porter Dodge, Perkinsville, Vt.:

I claim, in combination with the grooved soap-stone slabs, A, the iron or metal corner or angular plate, B, substantially as and for the purposes described.

I also claim, in combination with the grooved soap-stone slabs, A, and angular plate, B, the cap, C, substantially as and for the purpose specified.

45,983.—Revolving Fire-arms.—Wm. C. Dodge, Washington, D. C.:

I claim, first, The sliding lock bolt, q, arranged in bridge piece, p, as shown and described, whereby the parts can be locked automatically, and can be unlocked and swung over by a single application of the thumb, and the whole operation performed by the use of one hand only.

Second, Hanging the cylinder on the tubular bolt, g, or hollow journal, h, when connected by the frame at one end only, whether at the front or rear.

Third, supporting the detached end of the cylinder by the projection, i, and groove, j, substantially as specified.

Fourth, Locking the projection, i, in place by the latch, k, or its equivalent, substantially as shown and described.

Fifth, So arranging bolt, l, and latch, k, that both can be operated simultaneously, and by a single movement.

Sixth, I claim constructing and arranging bolt, l, and latch, k, in such a manner as to permit the front and rear portions of the frame to be locked automatically, as they are swung into position for firing, whereby the use of one hand only is required in the operation.

45,984.—Elastic Studs for Doors.—A. Eliaers, Boston, Mass.:

I claim, first, My improvement in the construction of doors, French windows, etc., which consists in the use of two or more elastic studs or buttons, working or rubbing against each other respectively, in the ends or edges of the swinging, sliding, or otherwise movable part, and the stationary rabbit or jamb, as described.

Second, The combination of the elastic studs or buttons, operating together, as described, and one or more elastic studs or buttons placed in the rear of the first set of studs or buttons, the whole serving to prevent noise and to hold in position, as set forth.

45,985.—Explosive Shells.—Edwin Estabrook, Jersey City, N. J.:

I claim the plane, or nearly plane faces, B1 B2, etc., on the interior of an explosive shell, arranged relatively to each other, in the manner and so as to produce the effect herein set forth.

45,986.—Fuse for Shells.—Edwin Estabrook Jersey City, N. J.:

I claim the employment in explosive shells of a fuse plug, adapted to collapse and crush by the action of the exploding charge, and to stop the escape of gas through the fuse plug, substantially as herein set forth.

45,987.—Cultivator.—J. W. Fawkes, Decatur, Ill.:

I claim the frame, E, applied to the draught pole, C, as shown, in connection with the foot levers, H G, arranged with the frame, to admit of the latter being operated as and for the purpose specified.

I also claim the pivoted plow standards, J, connected to segments, M, by bars, L, and links, J, in connection with the wooden pins, l, in the segments, all arranged substantially as and for the purpose set forth.

I further claim providing the segments, M, with handles, N, in connection with straps, O, on the frame, E, as and for the purpose set forth.

[This invention relates to a new and improved cultivator for plowing those crops which are grown in hills or drills, such as corn, potatoes, etc.]

45,988.—Gang Plows.—Wm. H. Freeman, Bloomfield, Iowa:

I claim, in combination with the stationary frame, A, the hinged plow beam or beams, F, and levers, G I and H, for the purpose of adjusting the hight as well as the inclination of the plows, substantially in the manner and for the purposes described.

45,989.—Piston Packing for Pumps.—Dwight B. Fuller, Buffalo, N. Y.:

I claim the combination of the follower, E, elastic disk, G, and leather bonnet, H, for the purposes and substantially as described.

45,990.—Washing Machine.—Squire Gambell, Otisco, N. Y.:

I claim the oscillating suds box, A, provided with the horizontal slats, g, and wash board, F, in combination with the fixed or stationary dash board, E, all arranged substantially as and for the purpose set forth.

I further claim the pivoted bar, G, with upright lip, K, attached, in connection with the projections, l, one or more, on the exterior of the suds box, for the purpose specified.

[This invention relates to a new and improved clothes-washing machine, and it consists in the employment or use of a suspended oscillating suds box, of semi-cylindrical form, in connection with a fixed or stationary dash board within the suds box, and a dash board attached to the suds box, and with or without a wash board, being arranged in such a manner as to operate very efficiently and without injuring the clothes.]

45,991.—Apparatus for Desulphurizing and Amalgamating Ores.—Eli P. Gardner, New York City:

I claim, first, The form and construction of the receiving and operating vessel, F, by which it is to be adapted to the uses and purposes required and designed, as above described.

Second, I claim the vertical shaft and its attachments of pins and revolving perforated diaphragm plate, combined, arranged and operating within the vessel, F, in the manner and for the purposes described.

Third, I claim the combination and arrangement of the operating vessel, F, the feed pipe and endless screw, I K, and the eduction or discharge pipe, P, and the rotation of the shaft and attachments, operating as described, so as to effect a continuous and uninterrupted operation of the process without stopping to charge or discharge the matter under treatment.

Fourth, I claim the combining and arranging the vessel, F, and the apparatus connected with it, and its contents with the washing tub or condenser and separator by means of educting pipe, P', and water pipe, Y, operating together as described.

Fifth, I claim desulphurizing the dust and dissolving the sulphur therein contained by subjecting the same to treatment with heated mercury, in a vessel in which the atmosphere or external air is admitted with the pulp, and uniting the fumes of the mercury with the fumes of the sulphur as they pass off within a vessel arranged, constructed and operating as described.

Sixth, I claim the construction of the water trough in the head of the operating trough, provided with a supply and discharge pipe for keeping cool the head and stuffing box, constructed and arranged and operating as described.

45,992.—Hay Spreaders.—W. C. Gifford, Jamestown, N. Y.:

I claim, first, The draught pole or thills, D, provided with a series of holes, d*, and operating in combination with the pins, d, loops, b b', and cross bars, c c', of the frame, A, in such a manner that the same can be readily taken out and changed, or lengthened or shortened, as may be desirable.

Second, The combination of the tilting frame, F, with the reel, E, and chain, h, substantially as and for the purposes shown and described.

Third, The hand lever, G, in combination with the belt, i, and tilting frame, F, applied as herein set forth, so that by touching the hand lever the belt and lever combined will raise or lower the frame.

Fourth, The serrated bar, m, and catch, m', in combination with the lever, G, and belt, i, as and for the purposes specified.

Fifth, The rakes, H, provided with teeth, p p*, and applied to the reel, E, in combination with the chains, p', spring stops, q, and cam, q', or their equivalents, constructed and operating substantially as and for the purpose shown and described.

[This invention relates to certain improvements in machines for turning and spreading hay, which act on the hay by means of a revolving reel, the rails of which are provided with suitable teeth to take up, turn and spread the hay as the machine is drawn over the field.]

45,993.—Grain Separator.—Horace N. Goodrich, Aurora, Ill.:

I claim, first, Providing the hopper with the feed-regulating boards, B, substantially as and for the purpose specified.

Second, The stationary strip or feed-regulator, E, when constructed and operating as and for the purposes set forth.

Third, The gang of series, F, with two or more of the sieves in the gang adjustable, and provided with the feed-regulator, E, substantially as and for the purpose herein described.

Fourth, Providing the shoes, G, with the grooves, I, so running into each other that a sieve or screen can be changed to different angles of inclination without being removed from the shoes, substantially as and for the purpose set forth.

45,994.—Cask for Preserving Beer, Etc.—Jacob Haege, Shiloh, Ill.:

I claim the combination of the piston, G, and its screw, c, with the plates, x x', and packing, F, substantially in the manner herein shown and described, so that by revolving the said piston rod the periphery of the piston will be expanded or contracted, all as specified.

The employment of the ratcheted nut, I, in combination with the screw piston rod, G, and piston, E, substantially as herein shown and described.

The construction of the plate, x', with cavities to receive the screws, substantially as and for the purpose herein shown and described.

[The object of this invention is to preserve beer, wine, and all kinds of juices and liquids in a fresh state, by preventing the contact of air with the said substances. This is accomplished by means of an exhaustible plunger, which fits the beer barrel or receptacle, the plunger being arranged to rest upon the surface of the beer, and to fall as fast as the beer is drawn.]

45,995.—Plows.—John Hanes, Polkville, Ky.:

I claim forming the plow stock; that is the curved front bar, b, ground bar, a, and brace, c, in one piece in combination with the manner herein described and shown of adjusting the same to the beam, B, and handles, R, through the intermediary of the brace, P, and crop bar, W, substantially as set forth.

45,996.—Sap Spile.—Mark Hays, Worcester, Mass.:

I claim a tubular sap spile, provided or formed with a screw to screw into the tree, a circumferential groove extending wholly or partially around the spile to receive the handle of the pail which receives the sap, and a square, b, to receive a wrench to screw the spile into the tree, substantially as herein shown and described.

[This invention relates to a new and improved tube for conducting the sap from sugar maple trees into a pail or vessel prepared to receive it.]

45,997.—Straw Cutter.—Clark R. Hewett, Waupun, Wis.:

I claim, first, The combination of the rotary knives, L L, hub, K, braces, l l, stationary knife, E, and feed roller, c, c', all constructed, arranged and operating substantially as and for the purposes specified.

I also claim the adjusting of the knife, E, by means of the sliding wedge, F, arranged substantially as and for the purpose specified.

I further claim the spring, g, when applied to the knife, E and used in combination with the rotary knives, L L, substantially as and for the purpose set forth.

[This invention relates to a machine for cutting straw, hay, etc., for fodder, and it consists in the use of two feed rollers and an adjustable stationary knife, in connection with rotating knives, all constructed and arranged to operate so that fodder may be cut with rapidity and with but a moderate expenditure of power.]

45,998.—Turn-down Enameled Paper Collar.—James H. Hoffman, New York City:

I claim the new article of manufacture herein described constituting a turn-down or folded collar, made and finished substantially in the manner and for the purpose set forth.

45,999.—Machine for Folding Paper Bags.—Ellis A. Hollingsworth, South Braintree, Mass.:

I claim the combination of the stretchers, K K, or their mechanical equivalents with the leaves or flaps, g g, the whole being so as to operate together substantially in manner, and for the purpose or objects described.

And in combination with the two leaves, g g, and their elevating mechanism as described, I claim the opening bars, h h, applied to the leaves and the posts substantially as and so as to operate as set forth.

46,000.—Rear Sight Base for Fire Arms.—F. W. Howe, Providence, R. I.:

I claim the employment of a band made of two parts and fitted to a recess or groove in the outer surface of the barrel and stock, and secured as described in combination with the barrel, stock and rear sight as described, and for the purpose set forth.

And I also claim the combination of the said band made in two parts, and fitted to a recess or groove in the barrel and stock, and secured as described, in combination with the back strap swivel, as described and for the purpose set forth.

46,001.—Horse Rake.—Edward Huber, Kelso, Ind.:

I claim the spring or elastic plates, G, attached to the handles, F F, and provided with the projections d, e, in connection with the plates, H, on the teeth of the revolving rake head, D, the handles being connected by pivot bolts to pendants, B, on thills, A, and all arranged to operate in the manner substantially as and for the purpose set forth.

[This invention relates to a new horse rake of that class which are provided with straight teeth, and arranged so as to revolve in order that they may discharge their load.]

46,002.—Vegetable Cutter.—F. Hullhorst, Freeport, Ill.:

I claim the combination of the changeable feed boxes, H d I and J f f, with the cutting wheel, D G, and casing, A, all arranged to operate as specified.

[This invention relates to a new and improved machine for cutting vegetables of various kinds both for family use and for fodder for stock.]

46,003.—Bread Cutter.—F. Hullhorst, Freeport, Ill.:

I claim the curved slot, G, in the plate, H, attached to box, A, in connection with the knife, D, arranged in connection with a slide, lever, pawl and rack, or their equivalents to operate the sliding bottom, B, substantially as and for the purpose specified.

I also claim the adjustable plate, O, when applied to the device to operate in connection with the bar, N, on the bolt, F, of the knife, D, substantially as and for the purpose set forth.

I also claim the guide plates, C C, in combination with the knife, D, and slotted plate, H, for the purpose specified.

I further claim the adjustable bar, N, on the bolt, F, of the knife, D, in connection with the crop head, M, at the end of the slide, I, substantially as and for the purpose set forth.

[This invention relates to a new device for cutting or slicing bread, and consists in a novel arrangement of a knife, knife-guide and a feeding device, all arranged in such a manner that the bread, as the knife is operated, will be fed to the latter and cut into slices of the required thickness, the knife at the same time operating with a drawing cut.]

46,004.—Screw Propeller.—Fritz Jacob, New York City:

I claim the screw propeller constructed with hollow bow-ended blades, B, of the form herein shown and specified and for the object set forth.

[This invention consists in a screw propeller with hollow wings arranged in such a manner, that each wing forms a channel through which the water is forced in a direction parallel to the shaft on which the screw revolves, while at the same time the faces of the wings act like the blades of screw propellers of the ordinary construction, and by these means the effective surface of the screw, and, consequently, its propelling power are considerably increased.

46,005.—Apparatus for Separating Metallic Filings.—Julius Johnson, Baltimore, Md.:

First, I claim the combination of temporary magnets fixed upon a shaft which is made to traverse back and forth as described, with a traveling apron for carrying the filings to be cleaned substantially as above set forth.

Second, I also claim breaking and re-establishing the circuit between an electrical battery and a series of temporary magnets automatically by means of the cams, m, the vertical rack and the lever, l, under a mode of operation substantially such as and for the purpose above described.

Third, In combination with the aforesaid lever, c' rack 14 and temporary magnets, p, I further claim the separate reservoir, U, and inclined partition, V, for the reception of the iron and steel filings as explained.

Fourth, I also claim the sliding sock shaft, s, the connecting rods, e, cranks, f, and shaft, g, in combination with the gear wheel, 7, substantially as described.

Fifth, I also claim the combination of the segment gear wheel, 5, pinion 4, and shaft 13, for imparting intermittent rotation to the apron, c, as explained.

Sixth, I also claim operating the rack by means of the lever, i, and the pin, h, on the wheel, 7, substantially as described.

46,006.—Method of Oiling Wool.—B. H. Lightfoot, Philadelphia, Pa.:

I claim, first, The application of prepared petroleum or other oily hydro-carbons to the oiling of the wool.

Second, The application to the oiling of wool of oily hydro-carbons, in combination with olein or lard oil, or other equivalent material.

46,007.—Stove-pipe Damper.—Edward Mackevitz and Wm. Frankfurth, Milwaukie, Wis.

I claim, first, The arrangement within a drum or a section of a stove pipe of the fixed and moveable partitions, C, D, and the fixed and moveable partitions, C', D', in two series, one above another, substantially as above described.

Second, We also claim weighting the moveable partitions, D, D', substantially in the manner described.

[This invention consists in a novel construction and arrangement of fixed and rotating partitions within a section of stove pipe whereby the products of combustion and heated gases from the fire are caused to take a circuitous path in escaping to the chimney so as to impart their heat to the sides of the pipe.]

46,008.—Photographic Card Mount.—T. Mayhew, Poughkeepsie, N. Y.:

I claim a photographic card mount, the surface of which is partially or wholly covered with gum or other suitable cement, substantially as and for the purpose set forth.

[This invention relates to a photographic card mount which is wholly or partially covered with gum arabic or other suitable cement or mucilage in such a manner that when the picture is wet and placed on said card, it will readily adhere thereto and the time and labor necessary in pasting the picture on the cards, and the danger of soiling them during this operation, is materially reduced.]

46,009.—Horse Rake.—E. C. Martin, West Liberty, Iowa:

I claim the combination with a revolving rake, A B B', of the flexible metallic supports, D D', attached at one end and so arranged as to move in contact with the ground behind the rake head, substantially as and for the purpose explained.

46,010.—Lantern.—Geo. C. Merrill, Chicago, Ill. Antedated Jan. 14, 1865:

First, I claim operating the wick ratchet in a lantern or lamp by a rotary motion of the oil cup or lantern.

Second, Operating the wick ratchet by the rotary motion of a rack or disk.

Third, The circular rack or disk, a, when used for the purpose of operating a lantern wick ratchet.

Fourth, The rack or disk, a, in combination with the pinion, c, and wick ratchet, d.

Fifth, The combination of the rack or disk, a, the pinion, c, and ratchet, d, with the oil cup, C, and base, B, all being constructed and operating substantially as set forth and specified.

46,011.—Pocket Lantern.—John A. Minor, Middletown, Conn.:

I claim a portable or pocket lantern constructed with folding sides and a folding top and bottom substantially as herein shown and described.

I further claim having the rear side, b, of the lantern constructed in the form of a narrow or shallow box provided with receptacles for candles and matches, and having its bottom provided with a pivoted plate to which the candle socket is attached and arranged so that the candle may be adjusted within the lantern or the box, substantially as herein described.

[The object of this invention is to obtain a lantern of simple construction which may, when not in use, be compactly folded and carried in the pocket, and still be capable of being readily unfolded and adjusted for use and possess ample room to contain candles and matches, so that the device may be always ready for use.]

46,012.—Ballot Box.—James A. McPherson, Troy, N. Y.:

First I claim the combination in a ballot box of the body or receptable, A3, and the top, A', separated by a valve, constructed and applied to each other, substantially as shown.

Second, I also claim the top, A', of the ballot box, composed of an open cylinder with transparent sides, a cover, S, with its valve and bell and hammer and a ballot-retaining mouth piece substantially as above set forth.

Third, I also claim in a ballot box, retaining the ballot in a receiving mouth set within transparent walls, so that it cannot be withdrawn upwards, but remains suspended for inspection until pushed through the mouth by a succeeding ballot substantially as described.

Fourth, I also claim the removable mouthpiece, 4, constructed so as to retain a ballot suspended in it, and prevent its withdrawal, substantially as above described.

[This invention has for its object the protection of the contents of the ballot box. The body thereof is made of glass, and its mouth is closed by a valve above which is a channel in which the ballot is suspended until the next ballot is inserted, when the former is pushed down into the box.]

46,013.—Wood-saw Frame.—Wm. Morehouse, Buffalo, N. Y.:

I claim straining a saw blade, B, by means of an arched or thrust brace, E, or its equivalent, constructed and operated substantially as described.

46,014.—Sofa.—J. W. Moyer, Cherry Valley, N. Y.:

I claim, first, A sofa or lounge constructed substantially as described; that is to say, with adjustable end pieces, D, D, provided with sector shaped supports, F, F, and a locking arrangement consisting of a pawl, G, and ratchet, H, so that the supporting sector shall at all times form a brace for the back and hinges, and shall form a continuous back and finish when the ends D D, are vibrated from their most erect position.

Second, Making the end finish on the outside of the front of the seat frame so as to cover the joint of vibration of the end pieces, a portion of the front of the latter vibrating immediately within side of the end finish.

[This invention consists in having the ends of the sofa attached to the bottom, a seat by means of hinges or joints, and leaving said ends constructed and arranged in such a manner that they may be adjusted and secured in an upright or nearly upright position like the permanent ends of an ordinary sofa, or be capable of being adjusted and secured in a horizontal or a more or less inclined position so that the sofa may be converted into either a right or left lounge, with an end more or less inclined as desired.

46,015.—Sawing Machine.—J. W. Moyer, Cherry Valley, N. Y.:

I claim, first, The combination of the slides, M M, moving vertically in guides, f f, and g g, respectively with the screw tension rods, I, I, passing through the threaded bearings, b, b', Figure 1, by which the saw is preserved from lateral deflection, rendered capable of relative vertical adjustment and means afforded for the attachment of varying lengths of saws.

Second, The herein described rolling cylindrical bearings, b b b, b', retained by metal straps or boxes, c, c, e, e', applied above and below the levers, F F', respectively and threaded for the passage of the screw tension rods, K I, L.

Third, The method of hanging the saw from the upper and lower bearings of the straining rods at, b and b', figures 1 and 3, so that when the levers are horizontal, one of the bearings, b', shall be in a line with the saw, which has a determinate motion by means of its guides, while the other bearing, b, shall be removed an additional distance from its centre of vibration equal to the versed sine of half the arc described by it in its vibrating motion.

[This invention relates to an improved sawing machine of that class which are commonly termed muley sawing machines, and which are generally used for sawing scroll work or wood in curved form The object of this invention is to obtain a machine of the class specified which will admit of the saw being kept at a proper state of tension at all points of its movement, and allowing the same to operate rapidly without creating jars or concussions, and at the same time avoiding the use of any parts which would serve as an obstruction to the feeding of the "stuff" to the saw, and the proper manipulation of the former while being sawed.]

46,016.—Coats with Inner Sleeves.—J. W. Moyer, Cherry Valley, N. Y.:

I claim, as an article of manufacture, a coat with an auxiliary sleeve or cuff, B, within and secured to the outer sleeve, A, as described and represented.

46,017.—Hay Rack.—Andrew Naramor, Berlin Hights, Ohio:

I claim the construction and arrangement of the bolster, C, and pieces, F, in combination with the rack as and for the purpose set orth.

46,018.—Hay Elevating Fork.—W. S. Newton, Norwich, Conn.:

I claim the combination and arrangement of the bar, c, tang or shank, A, with tines and handle attached, semicircular bar, D, and catch lever, E, with the spring, G, and rope, H, connected with it, substantially as and for the purpose herein set forth.

[The object of this invention is to obtain a horse hay fork which may be economically constructed, be strong and durable, and yet light and capable of being manipulated with the greatest facility by the operator.]

46,019.—Coal Screen.—A. M. Olds, Chicago, Ill.:

I claim the end coal screen above described, constructed substantially as set forth and consisting of the closed box, A, A', the part A, being removable and a screen, D, revolving eccentrically within the part, A', said screen having a door at one end or side and being so journaled on the part, A', of the box as to be removable at pleasure.

[This invention consists of a novel arrangement of a revolving screen within a closed box for screening coal and for similar purposes, the screen being suspended eccentrically and the cover of the box being removable.]

46,020.—Cut-off for Steam Engines.—J. H. Paine, Hartford, Conn.:

I claim, first, The spiral cam, J, applied in combination with the governor and with the main valve, C, and cut-off valve, D, substantially as and for the purpose set forth.

Second, The sliding pin, g, and hinged latch, e, in combination with the valves, C, D, and cam, J, constructed and operating substantially as and for the purpose described.

46,021.—Composition for Rendering Barrels Impervious to Oil, etc.—George R. Percy, New York City:

I claim as my invention for coating barrels and other vessels to contain oils and fats is a composition composed of water, borax and shellac in about the proportions specified, with the addition of a small quantity of glycerine, molasses, honey or glue.

And I also claim the process of the previous saturation of the wood with soluble silicate, in combination with the coating of the barrel or vessel with the above-described composition.

46,022.—Compound of Condensed Milk and Uncrystallized Sugar.—George R. Percy, New York City:

I claim the commingling of a quantity of uncrystallizable grape sugar with condensed milk, in the manner substantially as above described.

36,023.—Revolving Fire-arm. Reuben H. Plass, New York City:

First, I claim the trunnion ring, C c, adapted to embrace the revolving part and to allow it to be turned about on the trunnions, substantially in the manner and for the purpose herein set forth.

Second, I claim the hinged cap or rear piece, G g, arranged and operated substantially as herein represented and described.

Third, I claim, in combination with means for revolving the chambered part, B, on an axis transverse to the line of the barrel, making the face or front end of the chambered part, B, portion of a sphere having its center at the point where said transverse axis crosses the longitudinal axis and giving a corresponding concave form to the adjacent fixed parts, all substantially as and for the purpose within set forth.

Fourth, I claim the convex projection, G2, on the rear face of the cap, G, and the corresponding form of the recesses in the stationary part, A, to serve in combination with the rotating part, B, and perform the double function of a stop and an abutment for the recoil, all substantially as herein set forth.

46,024.—Composition for Varnish, etc.—Peter Prescott, Booneville, N. Y.:

I claim a composition for varnishing, painting, etc., made of the ingredients herein specified and mixed together, substantially in the manner and about in the proportion set forth.]

[This invention consists in a composition for varnish, paint, etc.' in which shellac forms the base or principal ingredient, and in which the use of alcohol is dispensed with, and a much cheaper, and, in most respects, better solvent is substituted therefor.]

46,025.—Combined Cultivator and Harrow.—Edmund D. Reynolds and O. Bradford Reynolds, North Bridgewater, Mass.:

We claim the combination of the cultivator shares, h, and rotary harrow teeth, m, when so arranged with respect to a carriage, a, that they are self-adjusting in their action upon the soil being cultivated substantially as set forth.

46,026.—Machine for Drying Paper.—George S. Rogers, Thetford Center, Vt.:

I claim the said improved paper-drying machine constructed with one or more drying cylinders, A B, two endless aprons, R S, and sundry guide rollers and planes, arranged in manner and so as to operate substantially as described.

46,027.—Hay Elevator.—Seymour Rogers, Pittsburgh, Pa.:

I claim as an improvement in hay elevators the rod, D, provided with the jointed arms, F F, in connection with the pointed case, A, all arranged to operate in the manner substantially as and for the purpose set forth.

I further claim the notches, e f, in the rod, D, in connection with the spring, G, and the hole, a, in the cap, c, and the eccentric, H, all arranged substantially as and for the purpose specified,

[This invention relates to a new and improved device for elevating hay and depositing it in mows in barns, and also for the forming of stacks, the implement, with its load, being raised by a horse.]

6,028.—Button-hole Cutter.—Francis G. Sanborn, Boston, Mass.:

I claim, first, A cutting bed for cutters and punches to be applied to the shanks of scissors secured and held adjustably on the shank by means of spring pressure, substantially as described.

Second, I also claim the use of the dovetailed or grooved frame of the cutting bed, B, for holding movable blocks of horn, vulcanized or hard rubber or gutta-percha, wood, or other substance for a cutting surface, as above set forth, when the same is applied to the shanks of scissors, substantially as above described.

[This invention consists in certain improvements in the cutting block of a button-hole cutter, to be used and fastened upon one of the shanks of an ordinary pair of scissors, in the way pointed out in Letters Patent granted to the inventor, for a button-hole cutter, on the 4th of Oct., 1864.]

46,029.—Bedstead Fastening.—John C. Santee, Hughesville, Pa.:

First, I claim the lugs, C and E, constructed and applied substantially as herein shown and described, to secure the parts of the bedstead together without mortices.

Second, In combination with the above, I further claim the ribs, R R', for affording an additional support to the rails.

Third, I claim the combination of the plugs, K, and flanges, e', for securing the lugs, e, within the posts substantially as and for the purposes herein set forth.

46,030.—Paper Washer for Paper Stock.—Geo. Escol, Sellers Landing, Ill.:

I claim washing pulp or fiber for paper stock by submitting it to the action of a centrifugal drainer so arranged as to permit the stuff to pass over the draining surface in a gradually thinning sheet, and to be washed by a continuous stream of water passing through it, substantially in the manner and for the purpose specified.

46,031.—Cane Stripper.—Geo. Escol Sellers, Sellers Landing, Ill.:

I claim, first, The stripping or breaking of the branches from the stems of cane or reeds, or stripping off the leaves only by blows struck by revolving arms, slats or blades, the cane or reeds being so fed as to insure contact with the part to be struck off, substantially as specified.

Second, Receiving the stripped cane upon an inclined table arranged with a stop to facilitate bundling, substantially as specified

46,032.—Eraser.—A. G. Shaver, New Haven, Conn.:

I claim an eraser constructed with a file-cut surface in combination with a sharp-cutting or scraping edge or edges, substantially as shown.

Second, An eraser constructed with a file-cut surface in combination with a sharp-cutting or scraping edge or edges and a convex burnishing surface, substantially as shown and described.

46,033.—Apparatus for Extracting Oils, etc.—Lyman Smith, Erie, Pa.:

I claim the tank, A, with perforated bottom, B, and tank, C, in combination with the tube E, and receiving tank, F, constructed and operating substantially as and for the purpose set forth,

46,034.—Metallic Cartridges.—H. C. Spaulding, Brooklyn, N. Y.:

I claim a metallic cartridge coated on its interior with a non-conducting coating, substantially as set forth.

46,035—Mill-stone Pick.—D. C. Stone, Kingston, N. Y.:

I claim the head, B, provided with an opening, a, extending entirely through it, longitudinally, and having a rack, c, at one side in combination with the key, E, and the lip, d, on the inner end of the pick blade, substantially as and for the purpose set forth.

46,036.—Steam Pump.—Levi W. Turrell, Newburgh, N. Y.:

First, I claim the combination of the valves, D1 D2 S1 S2, seated upon a common plate, M, and guided by sockets, d' s'', projecting downward from the cap plate, all as herein described to facilitate the inspection and removal, and replacement of the valves.

Second, In combination with the above, I claim disposing the several chambers of the valve chest, in such a way that the movement of the piston of the pump cylinder, will alternately open two of the valves and close two, in the manner and for the purpose explained.

46,037.—Vessel-of-War.—J. S. Underhill, New York City:

I claim the combination of the horizontal plates, a a, vertical bolt, b b', vertical plates, d d, and screws, e e, all constructed, applied and secured in the manner and for the purposes herein specified.

46,038.—Method of Inking Stamps, etc.—Charles M. Wetherill, Lafayette, Ind.:

I claim the use of an elastic buffer composed of glue and molasses or glycerine, or their equivalents, with or without admixture of insoluble powders, upon which coloring matters are spread with an elastic or firm roller or by other known means, and from which the aforesaid coloring matters may be taken by the pressure of a stamp thereupon, and transferred to the object to be stamped.

46,039.—Fanning Mill.—B. C. White, Richmond, Ind.:

I claim, in combination with the feeding hopper, the hinged adjustable and radially slatted or ribbed feed board, k, operating as and for the purpose substantially as set forth.

I also claim the combination of the rock shaft, d, and its crank arms and the crank wheel, f, with their several connections, to the first moving power and to the shoe, for the purpose of giving the shoe an end and side, or a longitudinal and lateral motion, substantially as and for the purpose described.

I also claim, in combination with the shoe, the loose screen, H, having a shake or jarring motion at its rear lower end, independent of, but in addition to, the motion it has with the shoe, substantially as described.

I also claim, in combination with the shoe, the adjustable windboard frame or slides, and the adjustable wind boards therein, as and for the purpose described.

I also claim the hanging of the shoe by means of the wire links, and turning hooks, by which it may be raised or lowered to adapt it to the blast or the character of the grain being cleaned, substantially as herein described.

46,040.—Shuttle for Looms.—Warren Wilder, Wilkinsonville, Mass.:

I claim the combination and arrangement of the springs, d g, when attached to the spindle shank, b, with cross pins, m, for operating the same, substantially as herein described.

46,041.—Process for making Cast Steel.—S. W. Wood, Cornwall, N. Y.:

I claim making cast steel by melting decarbonized iron, prepared substantially as herein described, in connection, or contact with charcoal, or other form of carbon, either with or without the use of black oxide, manganese or flux, substantially as specified.

46,042.—Extension Ladder.—T. C. Wood, Augusta, Mich.:

I claim the folding ladder, composed of the two parts, A B, connected together as shown, in combination with the removable and adjustable platform, D, all arranged substantially as and for the purpose herein set forth.

[This invention consists in constructing a ladder of two parts, connected by a hinge, and arranged in such a manner that the ladder may be compactly folded for transportation or when not required for use, or be adjusted so as to serve as a short ladder similar to an ordinary step-ladder, and also be capable of being adjusted as a long ladder, the two parts being in line with each other.]

46,043.—Street Steam Railway Car.—J. P. Woodbury, Boston, Mass.:

I claim, first, The combination of the boiler and engine of a locomotive, with a car truck provided with a circular truck frame and anti-friction rollers, so adjusted as to be received within one end of a car so that the truck can turn independently of the car, in the manner and for the purpose herein set forth.

Second, The combination of one end of a railway car with an independent circular locomotive car truck, when constructed in the manner and for the purpose herein described.

Third, Constructing the truck, I, with a circular track, i, provided with anti-friction rollers, h, to support the forward portion of the car, and allow the truck to turn with freedom under it, substantially as described.

Fourth, The independent circular carriage of radial anti-friction rollers to operate in combination with the top of the truck and the bottom of a railway car, substantially as described.

Fifth, Connecting the car to the center pin of the truck frame at the bottom, by means of the connecting bar, V, substantially as described.

Sixth, The employment of a center pin and connecting bar to connect the top of the car with the top of the engine and boiler truck, substantially as shown in figure 9.

Seventh, Forming the front of the passenger car concave and the engine and boiler room convex and circular, so that the one may turn in the other, substantially as represented in figures 7, 8, 9 and 10.

Eighth, Making the rear truck to turn on a center pin in the rear end of the car body, in combination with the circular tracks and carriage of radial anti-friction rollers which support the car body on the truck, substantially as described

Ninth, The anti-friction wheels, m, to operate in combination with the revolving engine room and passenger car, substantially as described.

Tenth, So constructing and arranging the smoke and exhaust pipe as to pass through the top of the car, directly over the center pin, U, wherever the boiler is placed, so that when the truck frame turns on a curve, said pipe may also turn with freedom through the car top, substantially as described.

46,044.—Grain Separator.—Elijah Young, Tuscarora, N. Y.:

I claim, first, So constructing and arranging the sieve, F, that it may be elevated at its rear end sufficiently to prevent any grain from passing over that end, substantially as and for the purpose set forth.

Second, Connecting the sieve, E, to the shoot board by means of hinges, as set forth and described.

Third, In combination with the vertically adjustable sieve, E, as described, the longitudinally adjustable discharging screen, C, as and for the purpose set forth.

46,045.—Coal-oil Lamp and Gas Stove.—Joshua E. Ambrose, Middletown, N. Y., assignor to Sarah T. Ambrose, Passaic, N. J.:

First, I claim the use or employment of the mica in the sides, bottom and top of the ovens, for the purpose specified.

Second, In combination with the stove, constructed as described, I claim the use or employment of the reservoir, J, and tubing, K, for the purpose specified.

Third, I claim the flue, B, constructed as shown for the purpose specified.

Fourth, I claim the use or employment of the dampers, E, in combination with the flue, B, for the purposes set forth.

Fifth, I claim combining with a stove, provided with the side ovens, C, the flue, B, for the purpose specified.

45,046.—Wringing Machine.—George N. Bolles (assignor to S. W. Walker & Co.), Kalamazoo, Mich.:

I claim, first, The two frames, A A', provided with rollers, C C, and connected together by the joints, B B, as shown, in connection with the elastic bar, E, spring, F, and set screw, G, all arranged substantially as and for the purpose specified.

Second, I claim the gearing, c c d d, in combination with the two frames, A A', and rollers, C C, substantially as and for the purpose set forth.

[This invention relates to a new and improved device for wringing clothes, such as are provided with pressure rollers, and it consists in a novel construction of the frame fastening for securing the wringer to the tub and gearing, whereby a very simple and efficient wringer is obtained, and one which may be manufactured at a very moderate expense.]

46,047.—Horse Hay-fork.—D. B. Clements (assignor to himself and D. H. Nash), Brooklyh, N. Y.:

First, I claim the arrangement of the link, c, connecting the hay-elevating fork with the hoisting mechanism and provided with the latch, 2, in combination with the metallic stock or handle, as specified.

Second, I claim the tooth, i, fitted to swing over the tines for holding the hay in its place in said tines, as specified.

46,048.—Machine for Pulverizing the Soil.—Lemuel S. Fithian, Absecom, N. J., assignor to himself and John Young, Joliet, Ill.:

I claim, first, Constructing the rotary pulverizer in sections, the cutters, M, of which coincide with frustums of a cone or cones, Substantially as and for the purpose specified.

Second, Giving the cutters, M, a raking position, and also an oblique position on the heads, L', substantially as and for the purpose set forth.

46,049.—Mode of Protecting the Surfaces of Wooden Piles.—Levy J. Henry (assignor to Joseph Beurime), San Francisco, Cal.:

I claim the use of alternate layers of asphaltum and sand or earth applied to piles and other articles exposed to the action of marine insects or worms, for the purposes specified.

I also claim coating or protecting piles and other articles from the action of salt water by means of asphalt applied upon sheets of felt or other material attached to said articles, in the manner and for the purposes specified.

46,050.—Window Shade Adjuster.—Enos T. Higham (assignor to himself and D. Higham), Philadelphia, Pa.:

I claim the grooved screw, A and h, bar, e, and the knob, f, or its equivalent, the whole being arranged and operating as and for the purpose herein set forth.

46,051.—Press.—P.C. Ingersoll (assignor to himself and Horace F. Dougherty), Greenpoint, N. Y.:

I claim, first, Elevating and depressing the follower by means of a screw shaft having its lower end fitted loosely to the follower, combined with suspension rods, g g, substantially as described.

Second, The combination of the loosely-fitting yoke, K, screw shaft, F, and suspension rods, g g, with a follower, substantially as described.

Third, Providing for opening the upper end of the press box by the employment of a laterally sliding follower, applied and operating substantially as described.

Fourth, The laterally sliding screw support or bridge beam, E E', in combination with the follower, G G', and supporting bars, a a, substantially as described.

Fifth, The friction rollers, b b, and bridge beams, E E', in combination with the holding-down beams, a a, substantially as described.

Sixth, The stops, i i, or their equivalents, in combination with the laterally adjustable bridge beams, E E', substantially as described.

46,052.—Field Fence.—Peter W. Knisken (assignor to himself and Jared G. Scott), Monee, Ill.:

I claim a portable fence with the adjoining ends of the boards recessed and notched in the particular manner herein shown and described, so that they will fit and lock together in either position, to produce at will a straight or a worm fence, as specified.

[The object of this invention is a portable field fence which can be readily put up or taken down whenever it may be desirable, and which can be used as a straight or as a worm fence without changing any of its parts.]

46,053.—Lamp.—Eliakim Mars (assignor to himself and Augustus Marsh), Newark, N. J.:

I claim attaching together the deflectors, b, and the button, f, in the manner hereinabove specified.

46,054.—Method of Converting Muzzle into Breech-loading Fire-arms.—Chas. E. Sneider (assignor to himself and Thomas Poultney), Baltimore, Md.:

First, I claim the lug bar, C, attached to the barrel by screws, c c c, and provided with projections, D D', for the pivoting of the bar, E, and lever, L, to the barrel, in the manner and for the purposes set forth.

Second, I claim the pivoted bar, E, constructed and employed as described, for the attachment of the breech, G, of a double or single-barrelled gun for converting the same to a breech-loader, the said bar being provided with a projection, E', at its rear end, and an abutment, E2, fitting the inclined back of the projection, I, on the lug bar, C, so as to constitute, in combination with the said lug bar, a rigid connection between the breech and barrel, while in position for firing, as explained.

46,055.—Brick Machine.—James Ward (assignor to himself and Garret A. Lans), Boston, Mass.:

I claim the combination and arrangement of the two adjustable scrapers, K L, with the preparing rollers, G H, the case, E, and the mold carriage, A.

I also claim the combination of the auxiliary roller, I, its chamber, N, and its adjustable scraper, M, with the mold carriage, A, the rollers, G H, the case, E, and the scrapers, K L, arranged together and within the case, E, substantially as specified.

I also claim the arrangement of the mold wheel, A, the case, E, the shaft, h, the roller, I, the chamber, N, and the mechanism for operating the rollers, G H, and the mold carriage, A.

I also claim the combination and arrangement of the annular rail, d, and the series of friction rollers, c, with the mold carriage and the series of plungers thereof.

I also claim the combination and arrangement of the series of lifters, c, and their cams, B C D, with the rotary mold carriage, A, the rail, d, and the series of friction wheels c.

46,056.—Machine for Punching Metal.—E. R. Hollands, Northampton Square, England :

I claim the combination of the tool holder with the movable wedge, the mechanism for moving it, the rollers and the inclines, or their equivalents, operating substantially as hereinbefore set forth.

46,057.—Machine for Making Cords, Ropes, etc.—Jules O. Methieu, of Paris, France. Patented in France, Feb. 12, 1863 :

I claim the arrangement of the flyer and bobbins or spools with their described intermediary connecting and operating parts, when constructed, arranged and operating as and for the purpose herein described and represented.

46,058.—Apparatus for Measuring and Testing Spirits and other Distillates.—Edward Payne, London, England :

I claim, in connection with a still or distillery, the combined use in one instrument, of a measuring and of a sampling apparatus, substantially as herein described, whereby small quantities of the spirit that passes over or through the apparatus, is retained for an after test of its proof, and beyond the reach of the operator, whilst the measured bulk or quantity passes through to any common receiver.

46,059.—Lamp.—Guiseppe Antonia Tremeschini, Vicenza, Austria :

I claim, first, The arrangement of the copper cone, A, and deflector, T2, in relation to ach other and to the disk, Q, and its air openings, T, for the purpose of admitting air from below the disk, deflecting it against the copper cone to be highly heated, and thence carried to supply combustion at the slot, at its upper end, as described.

I also claim the arranging of the wicks, b f g, within a tube E, that is, movable, within an outer stationary tube, B, and an intervening air space between them, as and for the purpose described.

I also claim securing the heads of the lamp to the bowl by means of a conical shank on the former, and a conical socket on the latter, the two making a tight metallic ground joint, substantially as described.

I also claim filling the lamp through an opening in the side of the neck thereof, by means of an instrument substantially such as described, that will flow off the excess of burning fluid beyond a given hight, as described and represented.

46,060.—Composition for Lining Barrels for holding Petroleum.—Henry Lowenberg, New York City, assignor to himself and Emile Granier, Paris, France. Ante-dated Dec. 10, 1864 :

I claim a substitute for india-rubber or composition made of the ingredients herein specified, and mixed together in about the proportion and substantially in the manner set forth.

RE-ISSUES.

1,854.—Curry Comb.—Cyrus W. Saladee, Putnam, Ohio. Patented Dec. 27, 1864 :

I claim, first, The two metallic handles, A' A', or their equivalent, secured to the sides or ends of the curry comb, in the manner and for the purpose substantially as shown and described.

Second, I claim the frame or plate, A, rivets, B B B B, studs, D D D D, figure 1, projections, figure 3, in combination with the adjustable handles, A' A', in the manner and further purpose, substantially as shown and described.

1,855.—Folding Table.—Joseph W. Wayne and Joseph R. Miller, Cincinnati, Ohio. Patented Jan. 12, 1864 :

I claim the folding table, having one pair of legs, B B', hinged to the top, A', and another pair of legs, D D', pivoted to and intersecting with the first pair, the upper ends of the legs, D D', being, in the standing condition of the table secured to the top by sockets, a a', and catches, E E', or their equivalents, and being wholly disconnected from the top for folding, as herein explained.

DESIGNS.

2,025 to 2,026.—Carpet Patterns.—Elemir J. Ney (Assignor to the Lowell Manufacturing Company), Lowell, Mass. Two Cases.



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.

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

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.

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 assignment 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.

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.

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

J. G. C., of Iowa.—1,000,000 parts of cast iron at 62° Fah., become, at 212°, 1,000,893. The expansion of wrought iron with the same increase of heat is from 1,000,000 to 1,000,984.

C. B., of Mich., asks how a man is to obtain redress against an infringer of his patent. Answer—Bring a suit. An infringer is liable to imprisonment if he does not, when ordered by the Court, desist from making a patented machine. All persons who use a machine without the consent of the inventor are liable for damages.

F. W. L., of Vt.—You will find it a dangerous experiment to attempt filling cartridges with fulminating mercury unless you know something of its properties and how to handle it.

T. F. of Wis.—A liquid glue is made in the following manner: white glue, 16 ounces; white lead, dry, 4 ounces; soft water, 2 pints; alcohol, 4 ounces. Stir the ingredients together and bottle while hot.

L. H. W., of Mass.—The owner of a patent is not, by law, compelled to put the patented article on sale.

J. P., of N. J.—One bulk of sulphuric acid to ten of water is said to be the usual pickle for removing sand from iron castings.

W. F. R., of Pa.—A good alloy for journal boxes is 24 copper, 24 tin and 8 antimony. Melt the copper first, then the tin, then add the antimony. It should be run into ingots and cast in boxes afterward.

R. H. M., of Pa.—Messrs. J. R. Brown & Sharpe, of Providence, R. I., will furnish you with a machine for cutting scales or indices on circles, squares, polygons, or figures of any known form.

J. M. A., of Canton.—We have received no former communication from you. When you write again inform us in what State you reside.

E. T., of D. C.—If your amendments to the patent law should be adopted we suspect that you would find in the practical operation difficulties and evils that you do not anticipate. It is a pity that all people will not respect the rights of others, then we should need no laws. When we attempt to make them do this by means of laws we find it a very difficult task, as all experience shows. When individual interest is enlisted men are exceedingly adroit in eluding the vigilance of statutes. It is probable that no law was ever enacted which did not prove less efficient for good and more productive of evil than its originator anticipated. The amendment proposed we consider impracticable. No Government would thus interpose to make positively valid the acts of men who are not infallible.

J. D., of N. Y.—There is no rule for showing the loss of power by the crank motion, because there is no loss. You will find this question very fully discussed in back numbers of this journal.

H. L., of Conn.—You will find in various hand-books of the steam engine for the last twenty years the information you require about the history of steam boilers. If you can have access to a library of mechanical works you can compile what you require readily, but you will find it difficult to get at anything satisfactory or reliable by desultory research. It is a long story to tell in a lecture.

J. W. C., of Wis.—You can use superheated steam for drying and boiling purposes with economy, provided the heat which the steam absorbs is otherwise wasted, or passes off unused. You can boil in any vessel that the steam surrounds, or dry on any apparatus which contains the steam.

A. H. C., of R. I.—Superheated steam may be at the temperature of red heat at a pressure of ten pounds, or two pounds to the square inch, or at any other pressure below that of saturated steam at that temperature. In the place spoken of it is employed to carry the air into a forge furnace.

J. R. N.—The attractive power of a magnet diminishes in proportion to the square of the distance, measuring from a point a little within the end. The powers of magnets vary with so many circumstances that no general rule can be given. There is a magnet in this city that supports seven men, and would probably support many more.

J. H., of Ohio.—The power of a magneto-electric machine is obtained by the slow combustion of zinc, which is worth 20 cents per pound—$400 per ton, while coal for a steam engine is worth only $10 per ton. The cost of power in a magneto-electric machine is at least forty times greater than in a steam engine.

T. V., of Ind.—We have several recipes for water-proof cement. One is, incorporate thoroughly eight parts of melted glue, of the consistence used by carpenters, with four parts of linseed oil, boiled into varnish with litharge. It hardens in about forty-eight hours. It is also said that a compound of glue with one-fourth its weight of Venice turpentine, made as above, serves to cement glass water-tight. We should be pleased to hear from some correspondent, who knows by practical experiment, of a good cement for aquaria.

S. R. H., of Md.—A steel bar can be divided into any required number of degrees; so fine, in fact, that the naked eye cannot distinguish them. Messrs. J. R. Brown & Sharpe, of Providence, R. I., have machinery for this purpose.

Money Received

At the Scientific American Office, on account of Patent Office business, from Wednesday, January 18, to Wednesday, January 25, 1865:—

H. C. K., of N. Y., $25; J. W. H., of N. Y., $35; T. & J. B., of N. Y., $25; W. E. R., of N. Y., $40; S. Van S., of N. J., 0; H. B., of N. Y., $15; R. E., of N. Y., $30; W. & W., of Pa., $22; W. L. F., of N. Y., $22; S. J. A., of Me., $20; P. R., of Conn., $30; J. G. M., of N. J., $15; H. J. H., of N. Y., $20; M. B. D., of N. Y., $40; P. L., of N. Y., $15; J. L. T., of Me., $20; A. M. O., of Ill., $40; T. S. S., of N. Y., $40; P. & B., of N. Y., $15; C. L. B., of Conn., $20; J. J. R., of Ohio, $20; A. P., of Hanover, $40; J. M. C., of N. Y., $15; W. S., of Mich., $20; D. C. A., of Iowa, $20; J. H., of N. Y., $20; R. & C., of Conn., $20; J. V. W., of N. Y., $15; W. E. R., of N. Y., $40; R. C. & M., of N. Y., $55; J. T. S., of N. J., $40; W. V. McK., of N. J., $15; A. M. H., of N. Y., $40; W. R., of N. J., $45; L. D., of N. Y., $25; S. C. B., of N. Y., $45; S. B., of N. J., $20; C. N., of N. Y., $20; G. F. J. C., of N. J., $20; D. S., of N. Y., $15; Mrs. L. E. S., of Ill., $20; W. S. W., Jr., of Ill., $45; J. N. E., of N. Y., $10; H. J., of N. Y., $20; S. S. S., of N. Y., $15; J. B., of N. Y., $15; T. R. T., of N. Y., $416; J. S. A., of N. Y., $100; W. G. W. J., of Md., $10; H. B., of Pa., $22; A. M. H., of Conn., $15; T. R., of N. Y., $20; A. H. N., of Mass., $15; W. W. T., of N. Y., $30; W. C., of Ohio, $25; O. K., of C. W., $37; T. I. B., of Tenn., $20; V. W. B., of Vt., $35; L. S., of Pa., $233; W. E. R., of Ill., $25; E. & B., of Me., $25; H. P. A., of Ohio, $15; H. F. H., of Ill., $202; P. B., of N. Y., $15; T. & M., of Ind., $25; C. L. McD., of Iowa, $16; C. C. T., of Me., $16; C. C. C., of Ill., $16; L. D. W., of Conn., $15; J. A. B., of Ill., $40; B. F. W., of Ind., $25; H. & Z., of Pa., $16; J. P. B., of Me., $16; A. Bro., of Conn., $25; S. B. H., of Pa., $16; D. G. H., of Mass., $65; J. W., of Mich., $20; M. B., of Conn., $15; L. R., of N. Y., $16; Y. C., of Ohio, $16; J. H. M., of Mo., $16; R. & J., of Ill., $16; S. S., of N. Y., $25; J. L. G., of Mass., $15; R. L. S., of N. Y., $30; J. K. & C. B. C., of Iowa, $25; D. & H., of Wis., $10; J. C. & G. S., of Mass., $30; A. M., of N. H., $25; E. S. H., of Mass., $16; J. L. S., of Ind., $20; J. E. P., of N. Y., $25; F. J. R. of Ill., $40; P. E., of N. Y., $15; B. & H., of N. Y., $15.

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. 18, to Wednesday, Jan. 25, 1865:—

H. C. K., of N. Y.; J. H. H., of N. Y.; E. A. P., of Wis.; F. & J. B., of N. Y.; W. E. R., of N. Y.; S. Van S., of N. J.; H. B., of N. Y.; H. L. H., of N. Y.; H. B., of N. Y.; E. E., of N. Y.; W. & W., of Pa.; W. L. F., of N. Y.; P. P., of Conn.; M. B. D., of N. Y.; R. C. & M., of N. Y.; J. T. S., of N. J.; A. M. H., of N. Y.; L. D., of N. Y.; S. C. B., of N. Y.; W. E. R., of N. Y.; W. C., of Ohio; W. W. T., of N. Y.; W. E. R., of Ill.; J. L. B., of Pa.; E. & B., of Me.; W. H. C., of Ind.; W. B. D., of Conn.; W. P. & H. A. A., of Conn; T. & M., of Ind.; V. W. B., of Vt.; B. F. W., of Ind.; J. C. & G. S., of Mass; R. L. S., of N. Y.; S. H., of Ohio; A. M., of N. H.; S. S. S., of N. Y.; I. C. P., of Ill.

TO OUR READERS.

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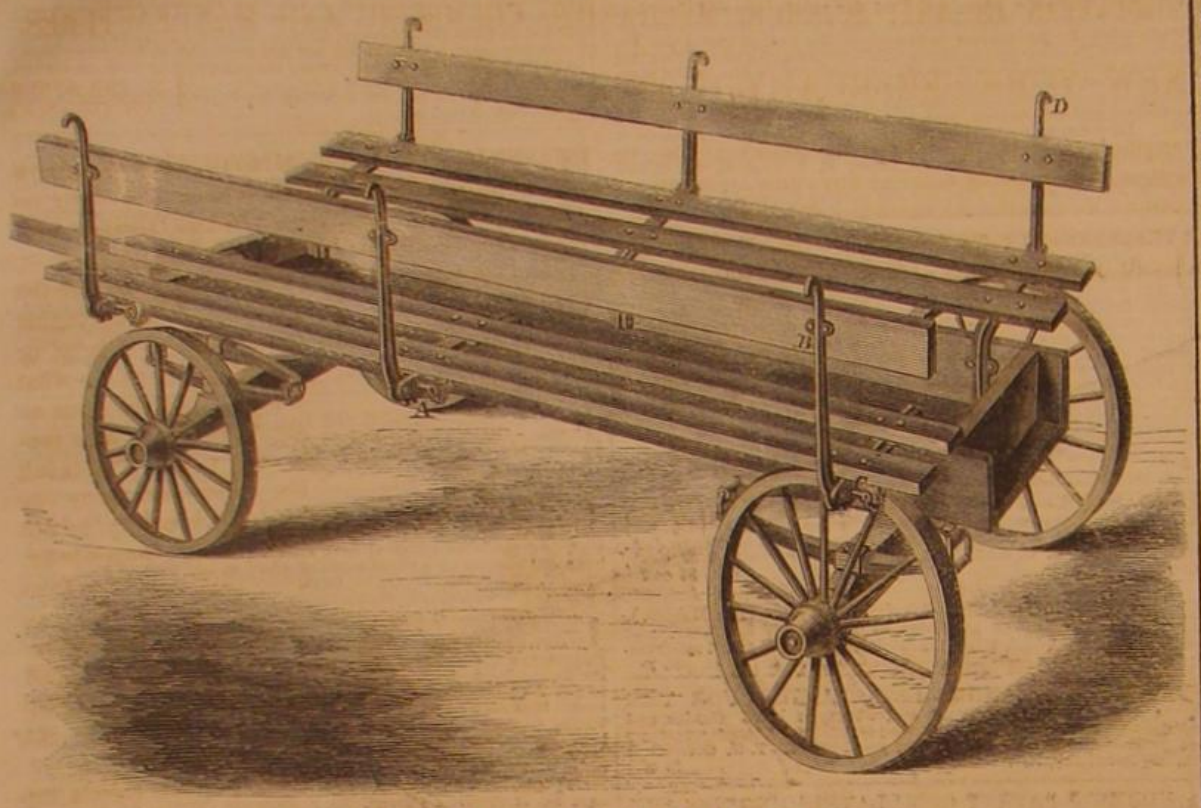
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Improved Rigging for Hay Carts.

Anything tending to aid the farmer in his labors should be tried, and adopted if found useful. We illustrate herewith an improved arrangement for hay wagons, which will much facilitate the operation of loading. The inventor says:—

"There are many features about this rigging that make it very cheap, convenient and durable. From the engraving it may be seen that it is attached to an ordinary wagon box. It can be put on or taken off in five minutes by one person, requiring simply a wood



REED'S RIGGING FOR HAY CARTS.

screw for each arm, to hold it in place. Many farmers having but one wagon to do all their work with are thus saved the trouble of taking off a cumbrous rigging and putting on a heavy box to go to mill or church, and vice versa. As the rigging is made of iron there can be no question as to its durability. There is an adjustable arm, A, at the end of the projecting arm, so that the vertical arm, B, may be set at any required angle, by inserting a pin, as at C, between the cogs on the end of the arm.

"The old method of binding with a pole is obviated by the use of this arrangement, and the load is held more securely by passing a rope from the hooks, D, at the tops of the vertical arms, from side to side, over the hay. This comprises the principal features."

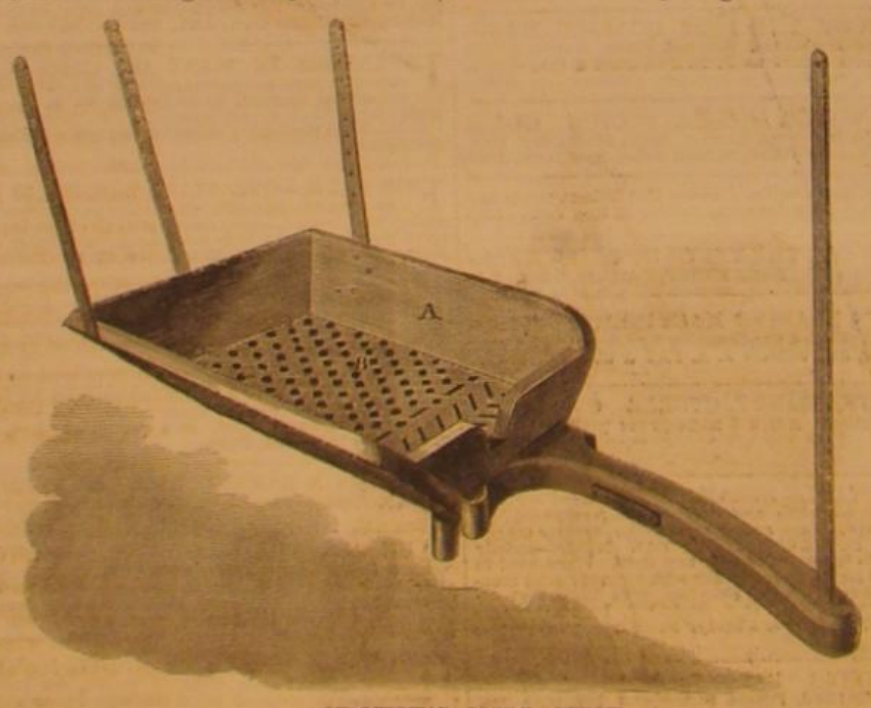
This invention was patented by Osmond Reed, on May 20, 1862. Further information can be had by addressing Reed & Chesebro, Grand Rapids, Mich. See advertisement on another page.

Improved Mill Shoe.

This invention consists in providing the shoe to the hopper of a millstone, with a screen arranged in such a manner as to effectually separate sand, cockle and other impurities, from the grain before the latter passes into or between the stones.

"This improvement," says the inventor, "separates these impurities from the grain, by passing it through or over the shoe in small quantities, just previous to entering into the eye of the stone. A represents the shoe, which is hung or suspended underneath the hopper of millstones. This shoe may be constructed and hung in the usual way.

"The novel parts are a round opening in the bottom of the shoe, underneath which there is another open-



CROUSE'S MILL SHOE.

ing to conduct the impurities from the shoe into any receptacle prepared to receive them. Second, A screen, B, is placed within the shoe, one end of which is attached to the rear end of the shoe by joints, while the opposite end rests on a shoulder or ledge. At the front part of the shoe a space of a proper depth is allowed between the screen, B, and the bottom of the shoe. To the screen, B, there is attached a transverse strip, not shown, which is inclined, and forms a partition, or barrier, within the shoe. This partition has two openings or notches made in its lower edge, and in the front end of the screen there is also an opening.

"The shoe, A, has the usual vibrating movement communicated to it by means of the ordinary damsel, and the grain falls from the hopper upon the screen, B, and passes down said screen, owing to an inclination given to the partition or barrier, which arrests the progress of the grain, and causes it to be evenly distributed over the screen, the grain finally passing through the opening or notches before mentioned, and out through the opening in the front end of the shoe, and falling into the eye of the stone. The sand, cockle, smut, chess, etc., pass through the screen, B, and are discharged through the opening and spout, C. The oblong hole in the front end of the screen is designed for the chess to pass through.

"The device performs its work well, the shoe cannot become choked or clogged, or rendered inoperative by small sticks or like impurities."

This invention was patented on Nov. 8, 1864, by H. P. Crouse, of Hartland, Mich., whom address for further information.

Professor Church, of the Royal Agricultural College, Cirencester, has recently been describing a new mineral from Australia. It is a sort of combustible shale, which occurs near the river Morsey, north side of Tasmania, and from it Professor Church has extracted a substance which he calls tasmanite. It seems to resist the action of all but sulphuric and nitric acids; alcohol, ether, and other powerful dissolvents have no action upon it, even on the application of heat, and its composition chiefly consists of carbon, hydrogen, and sulphur. When tasmanite is heated in the air, it burns readily with a very smoky flame and offensive odor, recalling that of some specimens of Canadian petroleum.

Joseph Whitworth, of England, asserts that he makes, or has made, musket barrels of steel so thoroughly annealed that they bulge when overloaded instead of bursting.

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