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## Improved Evaporator.

It is a well-known fact that sugar, in any form, submitted to a temperature of 400° Fah., caramelizes, i.e., turns brown; it is, in fact, fused and is no longer crystallizable; hence the absolute necessity of a low temperature to obtain the crystallization of all the crystallizable matter in saccharine juices, and avoid molasses of a tarry appearance and nature. Another

mentioned. The liquid to be vaporized is admitted through the pipe, F, and discharged at G (Fig. 1), and whatever moisture condenses on the roof, H, of the boiler, flows down it to the joint, I, which it fills and keeps tight while any surplus falls into the trough, J, and returns through it and the pipe, K, to the boiler again. It is claimed for the action of the steam escaping through the valve, D, that it creates a par-

farmer's boiler, or to larger ones, by a slight alteration, viz., removing or putting a tight bottom under the rim below the volute channel, and forcing the steam by a hole in the side of the under rim.

The apparatus is so simple and compact that it can hardly, if properly constructed, get out of order; it is light, and takes very little room when not in use, and is also very easy to clean. It can be applied equally to the evaporation of all saccharine matters, condensing of wine and cider, also to salt water, and many other uses in chemico-industrial works.

"To illustrate the enormous amount of flowing and evaporating surface," says the inventor, "a common apparatus, 6 feet in diameter—the size for sorghum and maple-sugar makers—would give an area of 27 square feet, and 58 feet length of channel. For

Fig. 1

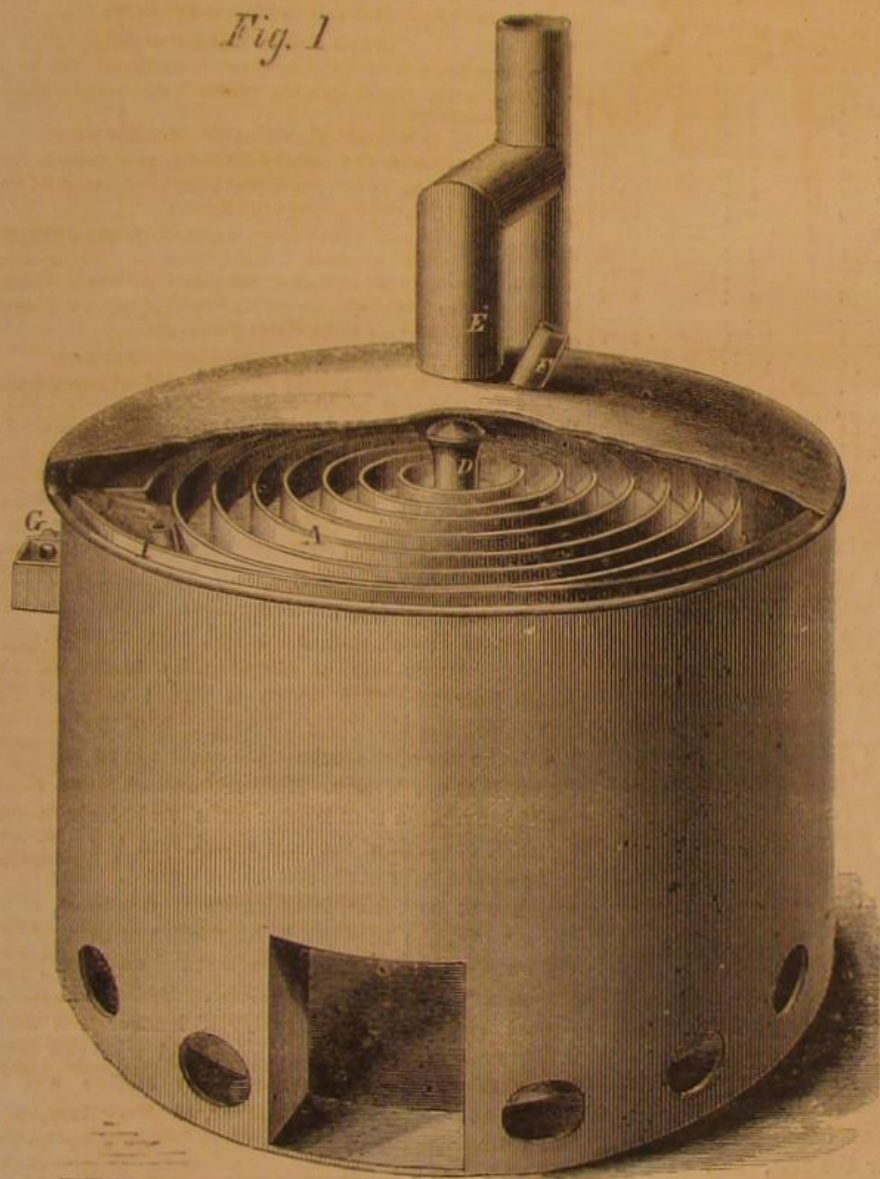
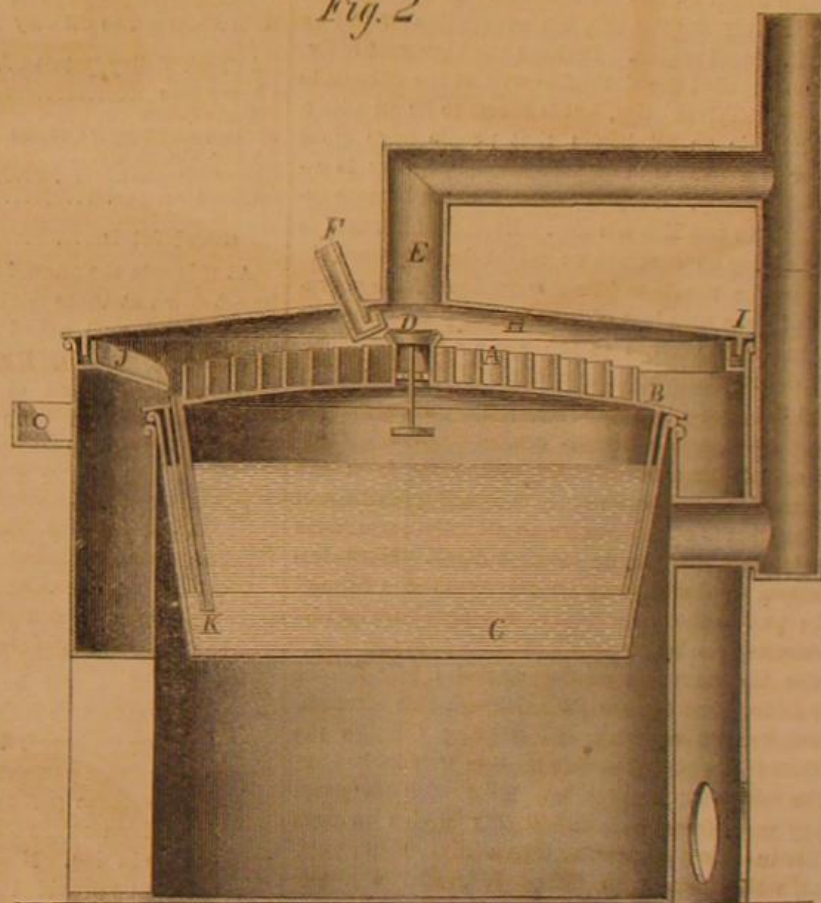


Fig. 2



## KOHLY & CURTIS'S EVAPORATOR.

fact is, that where the pressure of the atmosphere is partly or wholly removed, evaporation is more active, and ebullition obtained at a much lower degree than 212° Fah. Hence the application of a hot-air chamber, in this evaporator, gives evaporation in a comparative vacuum, thereby helping crystallization in the case of saccharine matters, besides saving considerable time and fuel.

The evaporator proper consists of a scroll-shaped passage, A (Fig. 1), formed by metallic walls on the top of the case, B (Fig. 2), and a boiler, C, wherein said chamber sets. This boiler is partly filled with water, and it is the steam from the water which supplies the requisite heat to evaporate the fluids contained in the channels, A. The heat is prevented from getting too great by the safety valve, D, inserted in the case, B; it being well known that for certain pressures the steam has a certain degree of heat which this safety valve, therefore, regulates by rising when the pressure is too great. Through the pipe, E, this steam escapes into the main flue, and this aids the draft in the furnace of the boiler before-

tial vacuum in the evaporating chamber, and thus facilitates the process.

The various advantages of this apparatus are as follows:—Perfect regularity of the heat applied; impossibility of scorching the saccharine matters; a considerable saving of time in evaporation by a constant flow in and out uninterrupted; the absorption of moisture by the dry air, and the ebullition in a comparative vacuum. The apparatus can be made self-skimming, if required, avoiding thereby a very filthy and tedious work; a great economy of fuel, as every particle of waste heat from the whole apparatus can be turned to account, after it comes out of the evaporator, to warm the contents of the feeding tank or vat. The whole operation must, of necessity, be cleanly done; the apparatus, being covered, no dust, flies, wasps, smoke, or other matters, can get access to it and spoil the contents. In naked fire evaporators it is not usual to start the fire before the cane mill. In this one it is quite different, and no matter how brisk the fire, it is impossible to injure the sirup. The apparatus can be applied to any common

plantations and large factories this apparatus will show a striking advantage in the single item of economy of room required for attaining the object in view, without speaking of other advantages enumerated above."

For the sale of State and territorial rights apply to the inventors, H. Kohly or J. Curtis, Potosi, Mo.

**INK FOR ZINC.**—The following is a recipe for indelible black ink to be used for writing on zinc:—Take 30 parts of verdigris, 30 of sal-ammonia, 8 of lamp-black, 8 of gum-arabic, and 300 of water; dissolve the gum in water, and pour it over the other ingredients, well mixed and reduced to powder. A quill pen should be used for writing.

The United States Pacific Railroad Telegraph line will be complete from Chicago to San Francisco in one year from the present time. Twelve hundred miles are already under contract, to be completed in 1865. This will make the second telegraph line to the Pacific, one being already in operation.



## THE OIL REGIONS OF PENNSYLVANIA.

A great deal of worthless trash has been written and published concerning petroleum, its origin and development; but we have, at last, a work which will both amuse and instruct all who are curious to peer into the mysteries of the oil speculations.

The Messrs. Harper & Brothers have just issued a work, entitled, "The Oil Regions of Pennsylvania. Showing where petroleum is found, how it is obtained, and at what cost; with hints for whom it may concern. By William Wright." The author is an energetic and thorough man, and pursued his investigations with industry and enthusiasm. Mr. Wright has been a frequent contributor to the columns of the SCIENTIFIC AMERICAN, and is the author of some articles upon petroleum which appeared in our last volume. We make the following selections from his valuable work:—

## INDUSTRIOUS PEOPLE.

No community on the face of the earth has a smaller proportion of drones to the number of working bees than Petrolia. This observation applies to city, village and single shanty. Nobody but has a hand engaged in some business or pursuit; many in half a dozen. If a man betakes himself to mercantile life, he reckons upon giving it from twelve to fifteen hours per day, filling up his leisure moments with speculation or an agency. The young fellow who would stand at the street corners elsewhere, there kills two birds with one stone by offering to sell wells, or interest in wells, or leases, or refusals to those whom he can button-hole. If Satan found mischief only for the idle, his occupation would be gone in the oil region. Perhaps the high cost of living has impelled the slothful as well as the diligent to this remarkable activity, but it seems to be an admitted principle on all hands that people have gone thither to work. On this account the country is essentially orderly. Property as well as life is more secure than in any Eastern city. Even drunkenness is by no means as common as might be expected, in view of the rough-and-tumble modes of life prevalent. I have seen less of it in Oil City or Titusville than in country towns of the same size elsewhere. Yet I do not believe that one man in fifty is a member of the temperance association.

## STRIKING OIL.

The sand pump occasionally brings up, from the first sand rock below the surface, small quantities of oil; but this is apt to receive no attention, operators knowing that it will soon exhaust itself. More frequently a good vein may be struck in the second rock; but on the lower part of Oil Creek and on its tributaries this is usually allowed to pass unheeded. On the Alleghany and on French and Sugar Creeks they seldom drill further than through this stratum. Elsewhere, on entering and passing through the third layer, "a good show" is most eagerly looked for, as the sand-pump comes up, filled with the gray, sloppy mass from beneath. If this begins to turn darker in color, separating into a thick, heavy sediment, which settles on the ground, and a green, slimy liquid, which floats away toward the nearest hollow, great indeed is the rejoicing; for the prospect of one hundred thousand dollars is within view. Indeed, the vein struck may, in an instant, anticipate reamer, sand-pump, tubing, and every thing else, sending up a spurt of petroleum which shall smite the top of the derrick and drive away the workmen, its rage only cooling sufficiently to permit them, after the lapse of a day or two, to return, insert the tubes, and guide the generous overflow into the cistern.

## OIL WELLS ARE UNCERTAIN.

Of those which were bored as early as 1861, I think it is safe to estimate that not more than one in a hundred have continued to yield steadily ever since, and are now affording enough to pay operating expenses. The Economy wells, at Tideoute, are most remarkable exceptions in this respect. The fact that that spring should have been reached within one hundred and fifty feet of the surface, makes the "record" of those works the more interesting. Certainly the whole region of Petrolia has no parallel cases to these; and at this moment I do not recall a solitary instance where a well, no matter to what depth sunk, has continued to flow or pump, without serious interruption, for four years, as they have done. Let

no lucky adventurer who may strike oil lay the flattering unction to his soul, that the spring which foams and bleeds so profusely in his presence will continue to pour forth oil in paying quantities for four, three, or perhaps even two years. Before the end of eighteen months it will not only call frequently for repairs and renewals, but probably have settled down to figures so modest as barely to cover working expenses. An oil-spring insurance company, did such exist, would not issue a policy, upon the first discharge of a well, that it would hold out longer than twelve months; at any rate, it would be unsafe to accept the risk of its continuing to yield more than ten per cent of the average of its first month's production. Indeed, experts have assured me that they have set down nine months as the ordinary period.

## NUMBER AND YIELD OF OIL WELLS.

The number of wells denotes, not the engines which were pumping merely, but those which were pumping oil on the days of my visit. On the Tarr and other farms I estimate that at least fifty more were at work, exhausting the water, making the active aggregate three hundred and seventy-five.

RECAPITULATION.			
Section.	Wells in Operation.	Total Yield, Barrels.	Average Per Day.
Watson Flats, Etc.	21	362	17.1
Miller Farm	1	28	28.0
Foster & McElhenny Farms	15	523	34.9
Funk & Boyd Farms	16	648	40.5
Wash. McClintock Farms	15	345	23.0
Hyde & Egbert Farm	6	725	120.8
Storey Farm	22	855	38.8
Tarr & Blood	19	411	21.6
Rynd & Widow McClintock Farms	14	147	10.5
Rouse & Buchanan Farms	17	415	24.4
H. McClintock to Oil City	16	682	42.6
Oil Creek Valley (total)	162	5,141	31.7
Cherry Run	51	1,972	38.7
Pithole Creek	3	300	100.0
French and Sugar Creeks	14	50	3.6
Lower Alleghany	51	404	7.9
Upper Alleghany	31	666	21.5
Omitted	10	317	31.7
Grand Totals	322	8,850	27.5

At this rate the annual product of petroleum may be set down at three million nine thousand barrels. We can very well afford to leave out of the account the odd thousands and accept the round three millions as the amount of very sensible perspiration which has exuded from the pores of our common mother in that 20 miles square block of Pennsylvania.

## PROBABLE YIELD OF WELLS.

From the best information accessible, I am led to estimate the average period of a good well's productiveness at eighteen months. In a majority of instances the repairing and tinkering done after that date does not pay. In any case the purchaser should be careful not to accept the first day or two's yield thereafter as what it will be on the average. Now, to reach one productive source, with all the knowledge that has been gathered, it is necessary to put down five wells. Some persons say that one-fourth of those now sunk become profitable; but taking the entire oil region, I am within the mark in setting down the ratio at one in five. Now, assuming that machinery has only to be provided for the first, and that the depth will be five hundred feet, the cost of renewals will amount to twenty-five thousand dollars. This multiplied by four hundred, the number of works already or prospectively yielding, would require an outlay, every eighteen months, of ten million dollars. I do not see how this heavy drawback can be safely reduced below five million dollars per annum, which would imply renewal only once in two years. In point of fact, the newly invested capital in the oil region is used to replace the old works as they give out, much of the original capital having disappeared for ever, either as unearned dividends, or gone to the wrong side of the profit-and-loss account.

Lastly, we have the Government tax of one dollar per barrel on crude petroleum. There is a short and easy method of arriving at the amount of that: If the yield for 1865 be three million five hundred thousand barrels, the excise duty will amount to precisely three millions and a half of dollars.

We are now in a position to cast up the account as follows:—

Value of the crude oil at the wells (say)	\$24,000,000
Operating expenses	\$2,500,000
Cost of replacing works	5,000,000
Government excise	3,500,000—11,000,000
Net profit (say)	\$13,000,000

This would pay seven per cent per annum, on a bona fide capital of one hundred and eighty-five million seven hundred and fourteen thousand dollars.

The political and commercial aspects of the subject are considered by the author, who offers the following estimates and conclusions:—

"That the wells in process of sinking will yield enough to make the supply keep up with what it now is, I have no manner of doubt. The prospect for 1865 is, that they will do considerably more than this; for 1866 they will at least equal it; beyond that year it is not advisable to venture on calculations or estimates of production in a field where the law of lawlessness has all along prevailed.

"If we add to the revenue to be derived on crude oil, that which is already being received upon the refined article (twenty cents per gallon), the aggregate receipts into the United States Treasury cannot fall below twenty million dollars, and may amount to twenty-five millions, during the twelve months stated. Of course, all this comes out of the pockets of American people as consumers; yet there is, perhaps, no other source, yielding so much revenue, where the load would be felt less oppressive than on this article, as is manifest from the fact that petroleum not only maintains its sway, in spite of these heavy impositions, but is extending it in every direction.

"It may be observed here that, by the present law, the greater portion of the lubricating oil nearly escapes taxation, the excise duty of one dollar per barrel on the crude article being barely three per cent on the selling value at the wells. As most of it is used in that condition, it is manifest that the revenue suffers considerable loss, or else the imposition is too heavy on the illuminating kind. A thorough revision of the whole subject is one of the first matters to which Congress should give its attention."

The volume is a valuable handbook, entertaining to the general reader, and useful to persons who hope to make their fortunes by "striking oil."

## A New Atmospheric Railway

A new railway, worked by stationary steam-engines, has of late been exhibited at No. 338 Albany Road, near Camberwell Gate. This railway is the invention of a Mr. Halliwell, and is worked, somewhat like the old atmospheric line at Croydon, by forced or exhausted air in a tube, which is placed between the rails, and runs along the whole length of the line, by which the use of the locomotive engine is superseded. The patentees, Messrs. Halliwell and Allison, claim for the invention that lighter rails and sleepers can be used, one-half of the coal saved, and the tear and wear on the rails made not half so great. The tube, which is of cast iron, is 18 inches in diameter, more or less. On the tube is a sliding valve of iron, which is so tight, it is said, that it will stand as much pressure as any other part of the tube. By the old atmospheric railway, a lifting valve of leather was used, which could not be made tight, and was the main cause of its failure. A stationary engine will be placed at intervals of five miles, more or less, with self-acting valves, so that through trains may be run any distance without stopping. With regard to the speed of the train, that, it appears, may be carried as high as fifty, or even a hundred miles an hour.—*Trade Circular.*

## Water Tanks for Ships.

The question of the best and safest material for the construction of water tanks for ships is being discussed in France. Galvanized iron, it seems, has been employed in the French navy, but this is condemned by M. Roux, the author of a memoir on the subject, who finds zinc in the water kept in such tanks, and in such quantities that he considers the liquid unfit for domestic uses. M. Roux has also made experiments on the preservation of water in tanks that have been ungalvanized by removing the coating of zinc with hydrochloric acid, which we may suppose to represent plain iron vessels. In one of these he placed distilled water, in another water issuing from the green sand and containing some chloride of sodium, and in a third river water containing more chloride of sodium. He found the largest proportion of oxide of iron with the distilled and river water. He recommended for the Imperial navy water tanks lined inside and galvanized outside, but he does not say how such tanks are to be made.



## NOTES ON NEW DISCOVERIES AND NEW APPLICATIONS OF SCIENCE.

## PAPER AS A MATERIAL FOR SUGAR MOLDS.

The molds used in sugar refineries are sometimes made of clay, sometimes of zinc or of plated copper, occasionally of glass, but, at least in France, most frequently of sheet iron, either painted or enameled. The great disadvantage of such molds is that the paint or enamel upon them invariably cracks after a time, whereupon, if the defect be not instantly remedied, the portion of metal which the crack lays bare rapidly oxidizes, causing the mold to deposit upon the sugar spots of rust, which greatly deteriorate its value. This disadvantage on the part of the molds in common use led MM. Dufournet et Cie., of Clichy, about seven years ago, to turn their attention to *papier mache* as a material for sugar molds, and it is stated by M. Clemandot, in a paper on "The Industrial Applications of Stiffened Pasteboard," which he lately read before the Society of Civil Engineers of France, that nearly a hundred thousand of their paper molds have now been in use for nearly six years, without any one of them requiring repair. The first cost of the paper molds is somewhat greater than that of iron molds, but iron molds cost an average of a franc and a half each per annum for repairs, so that, to set against the excess of first cost on the part of the hundred thousand paper molds, is the saving of the nine hundred thousand francs which six years' repairs of the same number of iron molds would have cost. The paper molds are still in excellent condition, so that the saving already realized does not represent by any means the full economy to be effected by their use. This is the first instance, we believe, in which *papier mache* has received any extensive application, but it is not likely to be the last. The lightness and cheapness of this material, together with its non-ability to breakage and its power of resisting the action of chemical agents, render it well adapted to replace glass, porcelain, and gutta-percha, for a great many purposes. MM. Dufournet et Cie. have begun to make of it basins and funnels for photographers, cells for electric batteries, and many other similar articles.

## VITRIFICATION OF PHOTOGRAPHS.

M. Regnault has presented to the Academy of Sciences some specimens of vitrified photographs produced by a still more elegant method than that which was described in these columns a few weeks since. This method is the invention of MM. Marechal and Tessie du Motay, and is a development of the principles which serve as the basis of photography in salts of silver upon paper and collodion. The inventors begin by dissolving four parts of caoutchouc in a hundred parts of benzine. They add to the solution so obtained one part of plain collodion dissolved in ether, and then pour the mixture upon the glass or porcelain plate, vessel, or other object upon which they design to produce and fix the intended photograph, so as to cover with a thin film of it the surface upon which the photograph is to be produced. After having been dried, either in the open air or in an oven, this caoutchouc-collodion film adheres to the glass or porcelain very firmly. When the film is quite dry, a layer of iodized collodion is poured over it. This second film "unites ultimately with the first, and thus acquires a resistance at least equal to that of a sheet of caoutchouc of similar thickness, a resistance which no kind of collodion possesses." The next step is to immerse the double film thus prepared in a nitrate of silver bath, and then to expose for a picture, either in the camera or in the printing frame. The picture may be developed by any of the solutions ordinarily employed for that purpose, but must be fixed by the successive action of two baths, one containing a solution of iodo-cyanides, and the other of cyanides (alkaline). When thus fixed, it is immersed for a few minutes in a solution of sulphate of protoxide of iron, or in one of pyrogallie acid, or of any other acid which will reduce the salts of silver. It must now be intensified by means of the reaction of either pyrogallie, gallic, or formic acids, or of a solution of sulphate of protoxide of iron, upon a solution of acid nitrate of silver. If what is to be produced is a vitrified photograph on glass, intended to be seen by transmitted light—to be viewed, that is, as a transparency—an amount of intensifying will be necessary which will require from twelve to fifteen baths; but

if the picture, whether it be on glass, porcelain, or other silicious material, is to be viewed by reflected light, from four to six intensifying baths will be sufficient. During this process of intensifying the pictures must be well washed, two or three different times, alternately in a bath containing iodo-cyanides and in a bath containing simple cyanides, and immediately afterward in a bath containing pyrogallie acid, solution of sulphate of protoxide of iron, or any other body capable of reducing silver salts. The object of these frequent alternate washings in iodo-cyanide and cyanide baths is to dissolve away every particle of silver which does not actually go to the formation of the picture—both the non-adherent argentic powder which is precipitated upon the whole surface of the picture by each intensifying bath, and the pulverulent or incompletely reduced silver, which, in ordinary photographs, constantly remains united to the metallic silver after the development and fixing of the picture, resisting the solvent action of the hyposulphites of ammonia, and that also of alkaline cyanide baths, employed alone. It is in the means which it affords of removing this superfluous silver, without touching the completely-reduced silver forming the picture, and of using as the medium on which first to produce the picture a film strong enough to permit of many washings and intensifications without the picture getting displaced or torn, that the essence and value of MM. Marechal and Tessie du Motay's very beautiful and ingenious process consist. The washing in a reduced bath with which they follow each series of washings in the iodo-cyanide and cyanide baths is for the sake of rendering the surface of the metallic silver forming the picture again neutral, or acid, and so bringing it into the condition in which the intensifying bath can best act upon it. After the picture has been sufficiently intensified, it is immersed for an hour or more in a bath of either chloride or nitrate of platinum, or in one of chloride of gold, or one in chloride of gold and one of nitrate of platinum alternately. This causes the silver of the picture to be partially replaced, in the one case by platinum, in the second by gold, and in the third by a mixture of platinum and gold. "The object," says the inventors, "of these several baths substitutive of the film of silver is to vary either the color or the nature of the picture after it becomes vitrified. For when we propose to obtain in the muffle furnace, by the action of boracic or silicic fluxes, pictures of a greenish black color, we previously immerse the picture in a bath of chloride or nitrate of platinum; when, on the contrary, we wish to obtain black pictures, we immerse them consecutively in baths of chloride of gold and nitrate of platinum. Lastly, when we desire to produce pictures in gold, we substitute exclusively baths of salts of gold." On leaving the platinum or gold bath the picture is washed in a saturated solution of ammonia, or in a solution of an alkaline cyanide, and is then dried, covered with an india-rubber or gutta-percha varnish, and submitted to the action of the muffle until the organic matters are all burnt away and only the metals forming the picture are left. It is then cooled, covered with a boracic or silicic flux, and finally exposed to an orange-red heat, which vitrifies it. The photographic picture is then rendered absolutely permanent—a fact which points to the probability of the vitrification process being restored to not merely as a means of producing pictures upon glass, for stained windows and the like, and of ornamenting objects of ceramic art, but also as a means simply of preserving photographs from decay.—*Mechanics' Magazine*.

## Puzzle Jugs.

The puzzle jug was an ale jug, and so contrived, by perforations in various parts, and by open work in the neck and spout, as to render it impossible to use it like other jugs. The liquor being drawn into the jug by the tapster, the puzzle was for the customer to drink it all without spilling. It became a prolific source of wagers, and most alehouses found it to their advantage to keep one or more of different forms for their visitors. The handle usually sprang from near the bottom of the jug and was carried up its "belly" some distance, when it bowed out in the general form, and was attached to the rim at the top. The handle and rim were made hollow, opening into the inside of the jug near the bottom, and around the rim were attached a number of little spouts, differently

placed, according to the whim of the potter. The ale could thus only be drunk by carefully covering up with the fingers all the spouts but one, and through this one the liquor would have to be sucked into the mouth. Beneath the handle a small hole was, however, usually made, through which, if not carefully and closely covered, the ale would spill, and thus cause the discomfort of the drinker and the loss of his wager.—*Life of Wedgwood*.

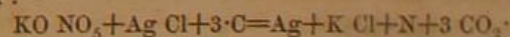
## Interesting to Photographers.

The following simple and practical method of receiving the solid silver from old solutions will prove of great value to photographers. We copy from the *British Journal of Photography* :—

"From the frequency with which inquiries seem to be made respecting the recovery of silver from old baths and wasted solutions, it would seem that the methods generally prescribed, simple as they are to any one in possession of a laboratory, yet present difficulties to amateurs out of the reach of furnaces, and that a yet simpler method of obtaining reduced silver in a compact fused form (in which state alone can it be safely relied on for furnishing pure nitrate) is for such persons still a desideratum. The following method will, it is hoped, put the recovery of silver in a compact and pure state within the reach of all, even in the most ill-furnished positions.

"Precipitate old nitrate baths with chloride of sodium in excess, and old hypo baths with "liver of sulphur" or sulphide of potassium, or, if this cannot be procured, with the yellow solution obtained by boiling lime and sulphur together for some time in water. The chloride and sulphide of silver thus obtained, after washing and drying, are then to be mixed with two or three times their weight of powdered nitrate of potash or saltpeter. Select a solid piece of well-dried wood, of dimensions in the proportion of about eight inches cube to half a pound of the above mixture; place a small quantity, say half an ounce, on the upper surface, and thrust in the red-hot end of a burning stick. When deflagration has fairly commenced, and a cup-shaped cavity has begun to form, add the remainder of the mixture, in small quantities at a time (for fear of its overflowing) by means of a spatula or spoon. If this has been skillfully done the whole quantity may be added without loss; and after the combustion is completed, there will be a deep cavity in the block containing the reduced silver in a spongy form, in the midst of a cake of carbonate and sulphate of potash and chloride of potassium. The whole is to be scooped out and thrown into water, which dissolves the salts, leaving the silver sponge, which, after drying, is ready for the second operation.

"In the above process the niter, in contact with the burning wood, furnishes oxygen to it, thus blowing the fire, so to speak, and keeping up a vigorous combustion, and in so doing becomes itself reduced to carbonate of potash, which at a red heat readily decomposes chloride of silver. The final result of the two steps of the operation may be thus represented :—



For fusing the spongy silver into a compact mass, a mixture known as Baume's flux, with a reduced amount of sulphur, answers perfectly. Mix six parts of saltpeter, two parts of dry and fine sawdust, and one part of flower of sulphur. Take a large iron ladle, put a layer of flux about an inch deep on the bottom, and above this alternate layers of silver and flux, using about two parts by weight of the latter to one of the former; press the whole tightly down. On setting this mixture alight it burns with great heat, and after the combustion is over the silver will be found in a single compact button at the bottom of the ladle, and after well washing in water it will be ready for solution in nitric acid. By this method, a lump of silver weighing many ounces can be obtained with great ease in a very short space of time.

"E. Hadow.

"King's College."

We learn from the *Biddeford (Maine) Journal* that the Peppercorn mills in that city increased the wages of their operatives upward of 20 per cent, so that old hands (females) are making readily \$1 25 per day. The company would run all their spindles if they had sufficient help.



# COMMENCEMENT OF POLYTECHNIC COLLEGE OF PENNSYLVANIA.

The twelfth annual Commencement of the Polytechnic College, of the State of Pennsylvania, was held in Concert Hall, Philadelphia, on the 30th of June, a large and intelligent audience, composed of the principal engineers, directors of public works, mechanics and scientific and "solid" men of Philadelphia and their families, greeted the successful aspirants for college honors. The music was performed by the Germania orchestra, the best in the city, and the exercises throughout were of an impressive and appropriate character.

The introductory address was delivered by Rev. Dr. Shields, whose theme was the economical development of American industry and the means of repairing the waste of war. He eloquently portrayed the position of the country and the gradual retirement of the weapons and engines of war to give place to the implements and engines of active, earnest and peaceful industry. Already the military engineer has been sent to the rear. The mine engineer, the civil engineer and the mechanical engineer were now at the front directing the innumerable army of productive labor. The Polytechnic College sustained to-day a high national position and her success was an additional guaranty of the steady and healthy advance of the applied sciences in our country.

The charge to the graduating class was pronounced by Hon. Ex-Governor Pollock, Director of U. S. Mint, who preceded the delivery of the charge by complimentary reference to the growth of the School of Mines in the College. He sustained his views of the value of that school, not only to the great mining State of Pennsylvania, but to all the other mining States, by quoting from official sources the wonderful yield from year to year of the American mines, the lucrative and responsible position open to native mine engineers, the direct manner in which the yearly increasing amount of our mine products facilitated the entire extinguishment of the national debt.

The President of the Faculty announced that the East Pennsylvania Agricultural School had been made a Department of the Polytechnic College, and that it would be opened as such in September next on a farm of 175 acres, purchased for the purpose, in Montgomery County, Pa.

The following are the names of the graduates, and the subject of their theses:—

## BACHELORS OF MINE ENGINEERING.

Frank Farmstone, Easton, Pa.—"The Construction of an Anthracite Blast Furnace."

Wm. G. Macdowell, A. B., Philadelphia.—"The Reduction of the Ores of Zinc."

Wm. Main, Jr., A. B., Philadelphia.—"Method of Attacking and Detaching Rocks."

Theodore F. White, Norristown, Pa.—"The Mechanical Preparation of Ores."

J. Price Wetherill, Bethlehem, Pa.—"The Oxide of Zinc as a Pigment; its Manufacture and Use."

## BACHELORS OF MECHANICAL ENGINEERING.

John Fowler, Philadelphia.—"The Storing and Distributing Gazometer."

Wm. D. Hewitt, Burlington, N. J.—"Casting and Founding."

## BACHELORS OF CIVIL ENGINEERING.

Charles Allmerding, Philadelphia.—"Roof Constructions."

W. Clarence Cranmer, Port Richmond, Pa.—"Canal Locks."

Henry H. Corson, Plymouth Meeting P. O., Pa.—"Wooden Truss Railroad Bridges."

Narcisse R. Dennis, Chester, Pa.—"Land Drainage."

George U. Engle, Philadelphia.—"The Preservation of Timber."

J. Pemberton Hutchinson, Newtown, Pa.—"Artesian Wells."

Percival B. Heilner, Pottsville, Pa.—"The Breaking, Screening and Purification of Coal."

William Johnson, Brandywine Manor, Pa.—"The Ballast and Sleepers of Railroads."

Samuel B. Judah, Vincennes, Ind.—"Piling Foundations."

John R. Jones, Conshohocken, Pa.—"The Aqueduct."

Benjamin C. Reeve, Allowaystown, N. J.—"Bridge Foundations."

Prospero B. Romen, Santiago de Cuba.—"The Iron Rail; its Manufacture, Weight and Proportions."

Wm. G. Smyser, Norristown, Pa.—"The Common Road."

Henry C. Thompson, Philadelphia.—"City Drainage."

The Master's Degree in Course was conferred upon the following Bachelors of four years' standing:—

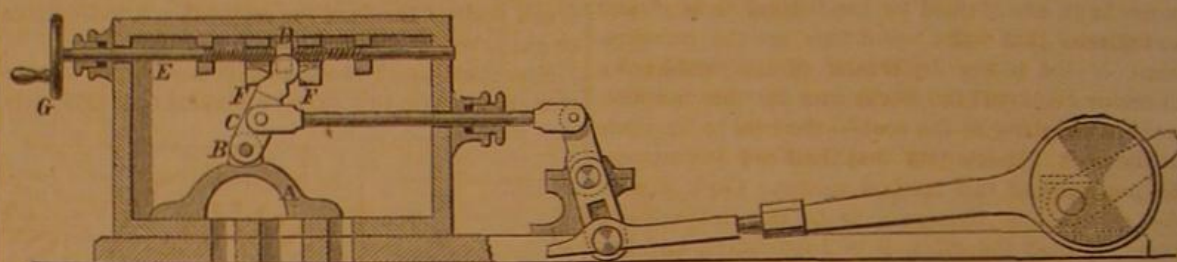
Master of Mechanical Engineering—Lewis W. Robinson, Assistant Engineer U. S. N.

Master of Civil Engineering—Joseph B. Hutchinson, Division Engineer Western Pennsylvania Railroad.

## Improved Slide Valve Movement.

The improvement herewith illustrated was patented through the Scientific American Patent Agency by John B. Cochran, of Brooklyn, N. Y., May 30, 1865.

It is claimed for this invention that the steam may be cut off at any point of the stroke desired without altering the lead. To effect this object the inventor provides the valve, A, with a lug, B, to which is at-



COCHRAN'S SLIDE VALVE MOVEMENT.

tached a lever, C. This lever is jointed at the top to a collar, D, which slides on the rod, E. There are on this rod two nuts, F, which have right and left-hand threads to correspond with those on the stem, so that when the hand wheel, G, is turned, the nuts will be spread open or drawn together. These nuts constitute a stop-motion, for when (says the inventor) the nuts are close together—as in the engravings—the valve will travel full stroke, but by throwing the nuts apart the collar will first slide on the rod until it meets the stop nut, and will then be checked in its motion and move the main valve, A, in a less degree, or a distance corresponding to the distance of the nuts from each other and the length of the levers. By varying the spread of the nuts it is claimed that a simple and efficient device for working steam expansively is obtained.

The owner of the patent is desirous to dispose of the whole right, or he will sell, upon reasonable terms, State rights. For further particulars address George G. Cochran, corner of Atlantic street and 4th avenue, Brooklyn, N. Y.

## A Dangerous Invention Brought to Light.

The following letter was sent to us by the private secretary of Governor Pierpont, of Virginia, who remarks that it was found among the private papers of ex-Governor Letcher shortly after the evacuation of Richmond. As "genius cannot thrive in fetters," so, consequently, "the combined atmospheric pressure and lever power" was not arrayed against the Government:—

"I notice in the Richmond *Enquirer* some one desires inventions that might be useful in repelling our enemy. I have a plan, which is to have a concealed lever which will move at the proper time, by the tread of the enemy, and which will spring a number of triggers that will set off as many bombs; also cannon, sealed water-proof, and set in rivers and bays. Vessels passing over them set them off, and are thereby destroyed. If you think my plan would be of any use, let me know. If I had money sufficient I would come down and show the mechanics how to do the work. I think my plan may be useful. I wish to do all I can for the safety of our country and make the path of the enemy a rough one. I have a plan for bringing atmospheric pressure and lever power combined to propel machinery. I am confident this will work equal to any power. If I can get the chance to come to Richmond and get the model made, and, if successful in this, I could have cars so constructed that we could run right in among the enemy and make tremendous havoc among them, and not be harmed by balls. This should be kept a secret. I wish to get a patent for it. As I put confi-

dence in you two gentlemen, if you think any of my plans will be useful, either or each of you can write to me and let me know what you think of it.

"Respectfully,

"To Governor Letcher and President Davis."

## Effect of Lightning.

Dr. Boudin, says the *Mechanics' Magazine*, has sent a note to the Academy of Sciences on the fulminating power of bodies recently struck by lightning, and of which he adduces two remarkable instances. On the 30th of June 1854, a man was killed by lightning near the Garden of Plants at Paris; the body remained for some time exposed to a pouring rain. After the storm two soldiers, in attempting to lift up the body, received two violent shocks. In the other case, which occurred at Zara, Dalmatia, two artillerymen who had been ordered to set up again in their former places two telegraphic posts that had been thrown down during a storm; took hold of the telegraphic wire. Although it was two hours after the storm, there was so much electricity left that the men

first experienced a few slight shocks, and then were both thrown to the ground. The hands of both were scorched, and one of them did not even for a time show any signs of life. The other, in attempting to get up, sank down again, and in so doing touched a comrade, who was coming to his assistance, with his elbow. The third man was then thrown down in his turn, experienced various nervous effects, and his arm was marked with a burn at the spot where he had been touched by the other man's elbow.

## Mountain Railways.

Pending the completion of the tunnel of seven and a half miles through Mont Cenis, and which—as more than four and a half miles remain to be pierced—will yet require seven or eight years, Messrs. Brassey have taken steps toward the construction of a railway over the mountain, to supply the break of forty-seven miles now existing between St. Michel and Susa, in the line of communication between France and Italy. An experimental line has been already constructed on the French side, between Lanslebourg and the summit, a distance of a mile and a quarter. Capt. Tyler reports officially to the Board of Trade that this experimental line possesses a mean gradient of one in thirteen, and a maximum of one in twelve. It passes round a sharp corner, joining two of the zig-zags of ascent on a curve with about two chains radius, and was purposely constructed on the most difficult portion of the route. Horizontal driving wheels act on a middle rail. The importance of these results to the future of railway construction in mountainous countries can, therefore, hardly be over-estimated. Capt. Tyler says the railway will be safer than the road.

## Hints to Purchasers of Precious Stones.

There are in practice, we fancy, only three rules worth much to the unskilled public when in search of really good stones. These are, first, never to buy of a jeweler, but always unset stones of a lapidary who deals in nothing else. He will give you an indefinitely larger choice at an indefinitely lower price, and as you can really see an unset stone, you have at least the advantage of your eyes, which you have not when the stone is crusted up with what it pleases some jeweler to call gold. Second, buy no stone of any value without a written statement of its weight, verified before the purchaser's eyes; and third, recollect that all stones except the finest diamonds and rubies are cheaper than the popular impression of their price, and that the inferior stones—beryls, topazes, amethysts, turquoises, garnets and onyx—are comparatively cheap indeed, being produced in quantities which render enormous prices simply waste of money.—*London Spectator*.



## Correspondence

### The Navy Controversy—Letter from Mr. Dickerson.

MESSRS. EDITORS:—Your paper of the 12th inst. contains a letter on the subject of the *Algonquin*, dated at Washington, and signed "Justitia," which evidently is inspired by high authority, and therefore deserves notice. Who is "Justitia?" Is it Capt. Fox, or Mr. Isherwood, or some of the contractors or engineers? Why does not "Justitia" give the public his real name when he appeals to the public, so that the public may judge for themselves, whether the assumed title means justice, or only an attempt to avoid justice? But whoever he is, he evidently has the official sanction and access to the department records; for he quotes the contract, of which but two copies exist, one on file and one in my hands; and it is a fair inference that he makes the best defense of the department that it knows how to plead.

"Justitia" says that the contract requires the power to be ascertained by the "usual tests;" and he declares that "the usual tests are the measurement of the power by means of the well-known indicator employed the world over for this purpose, and the weighing of the coal"—the trial to be made at the dock. It is a pity that the Navy Department did not think of this method earlier. Capt. Fox at first ordered the *Algonquin* to be run in the North River, against the affidavit of John Baird, and had her partly filled with coal the next working day after her arrival here, for the purpose of that trial. The unanimous denunciation of the press and of the public arrested him in his scheme; and he now discovers that a trial at the dock, with indicators, is the one provided for in the contract; and now the people's money must be spent in unloading the coal and hiring a dock, when a run on the river would cost nothing.

"Justitia," however, makes one true statement, to which I propose to hold the department. He says that when the wheels on both vessels are the same, and dip the same in the water, they will "themselves become a perfect dynamometer;" and if they be revolved faster by one engine than the other, that engine unquestionably develops the most power. That is true exactly! But the department won't submit to this "perfect dynamometer;" they insist on the combination of an indicator diagram, with John Baird or Isherwood to make the calculations, as the only "perfect dynamometer" which would give them any show of success; and to that combination I don't propose to submit, to the best of my present knowledge, information and belief. I am now in correspondence with Rear-Admiral Gregory to settle the terms of the trial, and I will give the public the correspondence when it is matured.

"Justitia" overwhelms me with the announcement that the Navy Department "has no correspondence with me; and has nothing whatever to do with me." This is not generous in "Justitia." Surely it is misfortune enough to have fallen under the displeasure of three such exalted beings as Secretary Welles, Assistant-Secretary Fox, and Engineer-in-Chief Isherwood, without being reproached with the calamity. A magnanimous man never exults over an unfortunate foe.

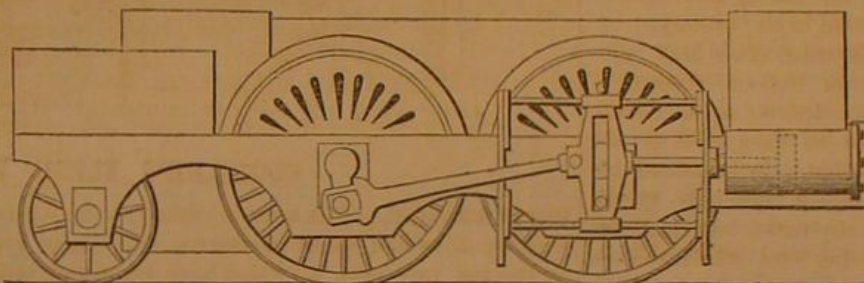
But "Justitia" is mistaken in his facts. The Navy Department has had something "to do with me." They issued a libelous pamphlet against me, containing twenty-two engraved caricatures, and forty-five pages of print, holding me up to ridicule, because I will continue to believe that James Watt, Marriotte and Regnault, knew more about the laws of steam than was learned by a newspaper reporter in an experiment tried on an old engine tied fast to the dock in Lake Erie—where the trick of proving that there is no benefit in expansion, by tying up to the dock, was first learned. This libel was distributed extensively from the Navy Department, and franked through the post-office as official business. I have a copy of it in the original envelope, sent by mail, with the Navy Department's frank as official business, and with the compliments of G. V. Fox, written in it by himself. That distinguished statesman and patriot kept a

large pile of these libels in the office which he adorns by his presence, and distributed them to all persons whose business required them to visit that dignified place, to the great disgust of many gentlemen, and to the great delight of those whose happiness it is to picture to us the proclivity of democracies, and the certain failure of our form of government. Yours, &c.  
EDWARD N. DICKERSON.

### The Slotted Yoke Connection.

MESSRS. EDITORS:—Though not a professional engineer, I nevertheless take a great interest in all matters relating to machinery—steam engines more particularly—and I am a constant reader of the *SCIENTIFIC AMERICAN*, which capital paper has a great many admirers, also, in Germany. I have had some business about steam fire-engines of late; several American specimens have been brought over to this country which were built by the Amoskeag Manufacturing Company, Manchester N. H. These engines are constructed after Caret's steam-pump system. [This is erroneous. Lee & Larned's have Carey's rotary pump.—Eds.] I often admired the ingenious device therein adopted for directly transferring the to-and-fro motion of the piston rod to the crank shaft of the fly-wheel without connecting rods or guide boxes.

Some time ago I made a small model of a locomotive engine with two pairs of coupled driving wheels,



and the idea struck me to try the above-mentioned system for one pair of the wheels in place of the usual two connecting rods used in these cases. The illustration will speak for itself and show the manner how the thing was done.

This model worked very nicely; but what I should like to know is, whether you believe this arrangement to be practicable for large locomotive engines, and whether it offers some advantage over the coupling system now generally used?

At all events, space, friction and material may be saved by this transmission. I should almost think this plan to be an old friend altogether, though I never read about it in mechanical periodicals, so that it may be a new thing after all. But again, on the other hand, who could read and learn everything new brought out in machinery?

What do you think about this novelty? Perhaps even such a thing as a patent might be procured on it.

Do you think a substitute for sulphuric ether, in photographic collodion, might be found? A great many photographers suffer with nervous debility caused by constantly inhaling its highly oppressive vapors. I think the substitute in question would be a fortune to the successful discoverer.

CH. LINDT.

No. 25 Echtersheimer Chaussee, Frankfurt-on-the-Main, Germany, July 14, 1865.

[The slotted yoke connection is one of the oldest devices for converting reciprocating into rotary motion, and is only available on short strokes and small cylinders. The strain of the crank in rotation is so violent and unequally distributed—first at the top and then at the bottom—that it requires the piston rod to be unusually heavy to resist its action. The box must also have more or less play to allow it to pass the center, and it soon wears so that it thumps badly. All the evils of a short connecting rod are concentrated and condensed in this arrangement. For a locomotive it would be wholly impracticable. The hint about collodion is worth attending to, but much attention has been given to it already.—Eds.]

### Economy in The Use of Oils.

MESSRS. EDITORS:—My attention has been called to a somewhat important subject, viz: whether the shape and size of chimneys and founts regulate the amount of oil consumed in a given time. It has been noticed in our household that in the case of two

lamps—kerosene—with the same sized fount and burner, but different-sized chimneys, one had to be filled oftener than the other; the one with the small chimney twice to the one with large chimney three times—both burning the same number of hours.

No doubt some of your intelligent readers can answer, and others will, by experiments, try to solve the question; and to them allow me to submit the following for solution:

First, Whether chimneys, large and small, tend to increase or diminish the consumption of oil, time of burning-fount, and burner being equal?

Second, How long will a quart of oil last, burned in the most economical way, in an "A" or "B" burner? The answers made public through your highly appreciated organ would be desirable.

ADOLPHUS BENEDICT.

Williamsburg, L. L., July 26, 1865.

### Wire Cloth for Bolts.

MESSRS. EDITORS:—You recollect I wrote to you several years ago for information about the most improved plan to cover a set of reels for a merchant mill; and also what to do to keep the bugs from eating holes in the cloths. I have since obtained the information, and now send it to you for the benefit of all whom it may concern, and particularly that of John H. Teahl, Cumberland Valley Mills. I would say, cover with wire cloth. We use it on a grist reel, and it works well; and on it Mister Bug can only stop to whet his bill.

Where wire is used the reels need not be so long by one-third, and for bolting meal made from damp wheat it is far preferable to cloth. Wire is now manufac-

tured to suit all numbers and sizes, ranging from No. 2 to No. 60. Iron-wire cloth and brass from No. 2 to 70, and may be higher, for all I know. No. 60 iron-wire cloth is fine enough for superfine flour, and No. 30 for corn meal. All descriptions of wire can be obtained at the manufactory of Sterling Smith, No. 29 Fulton street, New York. His prices in peace times vary from 12½ cents per square foot to 45 cents, for iron, and 30 to 80 cents for brass. I am not able to say what the war prices are. I think we shall use it on our merchant reels when they want re-covering.

Now I will ask a question. How does wire cloth compare in number with the old Dutch cloths now in use? Is No. 60 wire equal to No. 10 cloth? And in what way do they run? Will some of our wire manufacturers send me a number as high as now made, with the prices and the widths?

If any person has had any experience with wire-bolting cloths, I should be pleased to hear from him.

G. W. WASKEY

Springfield, Ohio, August 7, 1865.

### Molds for Casting Iron Pipes.

MESSRS. EDITORS:—Observing in a recent issue that you notice as new the application of centrifugal force to the casting of iron pipe or tubes, said to have been invented by M. Auguste Larden, an employee at the iron works of the Messrs. Holmberg & Co., at Lund, Sweden, you will oblige me by calling attention to the fact that this principle was patented by Mr. Thomas J. Lovegrove, of the City of Baltimore, in the year 1849, as by reference to patent No. 5,988, of that year, will appear.

Let me further add, that tubes of iron, lead, copper, glass, etc., were manufactured at Canton, near the City of Baltimore during the years 1831-52.

New York, Aug. 5, 1865.

[There are many things patented in England which have been used a long time in this country.—Eds.]

### To Draw a Cork without a Corkscrew.

MESSRS. EDITORS:—To draw corks from bottles without injury to the cork and without the aid of any instrument, grasp the bottle in the hand and strike it squarely upon any firm place, right side up, with such force as it will bear without danger of breaking. A few blows will extract any ordinary cork, whether the bottle be full or only partially so. What is the true explanation of this?

GEO. T. McLAUTHLIN.

Boston, Mass., Aug. 7, 1865.



**Why Mountains are Colder than Valleys.**

MESSEES. EDITORS:—The fact that the upper regions of the atmosphere are colder than the lower is generally ascribed to two causes. First, terrestrial volcanic heat communicated to the lower strata of air by contact; second, the conversion of some portion of the solar rays into heat by their passage through the atmosphere.

The theory of the convertibility of forces—now pretty well established—does not admit of the latter explanation. According to this theory, light considered as a force, in its passage through a perfectly transparent body—such as the pure atmospheric air nearly is—produces no change or phenomenon whatever; but whenever any portion of the light is absorbed or retained by the body on which it falls, the force is not destroyed, but changed into some other form, generally—and especially in the case of sunlight—producing heat. Hence, but very little heat can be gained from the solar rays on their transmission through clear air, as very little light is lost in the same; and whatever heat the air possesses must chiefly be obtained from another source than radiation. This source is contact with terrestrial objects. These latter are all to some extent absorbents of light, that is, opaque bodies. The absorbed light is transmitted into heat, and thence communicated to the nearest strata of the atmosphere, *i. e.*, the lowest. Hence these are warmer.

The principle at the bottom of this theory can be tested by any one. Let a pane of glass in your window be clean and hence transparent, and another pane dirty, and hence semi-opaque. Both being exposed to an afternoon's sun, the clean pane will be very appreciably colder than the other. Again, on a clear, "blue" summer's noon let a breeze stir, and it will feel remarkably cooler than one of the same strength and direction when the air is charged with moisture, and the sky dingy. This has been proved with an air thermometer. Hence the former kind of weather is simply called hot, while the latter is "sultry." In the one case, the transparent body lets all the light, or very nearly all, pass; in the other, the partially opaque body allowed a portion of light to pass and changed the rest into heat.

G. MULLER.

New York, August 5, 1865.

[We should suppose the principal reason why moist is more sultry than dry air is, that the vapor of water transmits heat more slowly than air. This fact was very fully established by Tyndall. Absorption of heat by terrestrial objects is doubtless one cause of the higher temperature of low altitudes, but we doubt whether the conversion of light into heat plays any important part in this result.—Eds.]

**The Way Tubes for Artist's Colors are Made.**

MESSEES. EDITORS:—As a recent number of the SCIENTIFIC AMERICAN indicates a desire on the part of a subscriber to obtain information respecting the process of manufacturing the small tin tubes used for artists colors and a variety of other purposes, I have forwarded the following description of the process as carried out in England under Rand's Patent, and called "Rand's Patent Collapsible Tubes."

"These thin tubes are closed at the one end by a convex disk with a projecting screw; the screw being perforated for the expulsion of artist's colors or other matters inclosed in the vessels. They were first drawn as tubes and the ends cast and soldered in, but the entire vessel is now made by only two blows, in dies of appropriate kinds. By one blow of a screw press, a thick circular disk of tin of the external diameter of the intended vessel is punched out, made concave, and perforated with a central hole, somewhat like a washer for machinery. By a second blow, the blank or button is converted into the finished tube. The bottom tool is a mold with a shallow cylindrical cavity of the same diameter as the button of tin, and terminating in a hollow screw. The upper tool is a cylinder exceeding the length of the tube, and with a small taper spindle of the diameter of the hole. The cylinder is just so much smaller than the mold as to leave an annular space equal to the intended thickness of the tube. The very soft, ductile tin, when submitted to great pressure in the concentrated space within the mold, follows the laws of liquids, and may be said literally to flow through the annular crevice, and up the cylin-

dric mandrel; as indeed the formation of the tube appears to be instantaneous, and is a beautiful example, both of true principle and accurate workmanship, in the means employed.

The tube is released from the mold, first, by the ascent of the cylinder, which leaves the tube behind; and the screwed extremity of the mold is then driven up by a cam and lever from below, and the screwed dies, being divided on their diameter, instantly fall away from the vessel thus elegantly produced by a mode which was only attained after repeated variations in the process, respectively secured by patents. Small tubes are thus made in screw presses, and large tubes in hydrostatic presses of proportionate strength."

The above description is at your service if of any value.

ABEL S. CHAPPELL.

Brooklyn, Aug. 10, 1865.

**Velocities.**

MESSEES. EDITORS:—Under the above title, in a late number of your valuable paper, I noticed an article signed "X," in which I find the following statement:—

"A cannon ball, fired perpendicularly, ascends with decreasing but falls with increasing velocity, and describes each portion of its path upward and downward, respectively in identically the same period of time."

May I be allowed to ask your correspondent "X" how he has ascertained this fact? And whether the size of the ball or weight of metal and the height at which it is fired, has any thing to do with it? Why should not the same law apply to small rifle balls or even the common bird-shot, say No. 4? This fact I have proved many times—that No. 4 shot may be fired from a gun with sufficient force to go through an inch board at fifty feet, and yet this shot may be fired perpendicularly and allowed to ascend as high as it will, and on its return will fall harmless upon the bare hand.

Waltham, Mass., July 31, 1865.

[The law applies only to bodies rising and falling in a vacuum. The resistance of the air diminishes the velocity both of the ascent and of the descent, and this resistance is greater in proportion to the weight in the case of small balls than in that of large ones.—Eds.]

**A New Plan for Preparing Bird Skins.**

MESSEES. EDITORS:—In your last paper I saw an article about skinning and stuffing birds. I have found myself that it is a tedious and often difficult job so to stuff them that they look life-like, and I, therefore, tried another plan, which succeeds very well. I do not skin the birds at all, but make only an opening in the lower part of the body, remove all the intestines and insert in the empty space cotton, impregnated with a mixture of one part of creosote, three parts of alcohol, and one-quarter part arsenic acid; a wire, wrapped in cotton, saturated as before, goes through the neck. After sewing the opening up I lay the bird on its back for about two weeks, when it is fit to be set up. The flesh dries up like ham, without any perceptible shrinking, and the bird retains its original shape. The largest bird tried was a duck, but I think it might do with any size. To drive the disagreeable smell of the creosote away, I put the birds, after drying, in a baking oven when it is not too hot. I hope some of your readers may try this method and let us know the result.

GUSTAVUS H. SCHMIDT.

Swatara, August 6, 1865

**To Glue Manufacturers.**

MESSEES. EDITORS:—I have perused with much pleasure an article in a late number of your valuable journal, on the manufacture of glue, which, however, appears to me, to relate to the art as practiced in England. Will not some of your numerous readers, practically familiar with the subject, give us an exhaustive account of this art, as conducted here, and of its kindred branches?

G. L.

New York, Aug. 12, 1865.

**A Mechanical Problem.**

MESSEES. EDITORS:—I propose to submit a question in dispute between some of our Western mechanics for your decision. Suppose a wheel, traveling on the ground, having an inside rim containing

cogs—for instance the main wheel of a reaping machine—and suppose there is attached two pinions of an equal number of cogs—one at the top and the other at the bottom of the main wheel—which one of the pinions will make the greatest number of revolutions in traveling a certain distance; or is there no difference in their motion?

A. TEMPLE.

New Salem, Ill., Aug. 6, 1865.

[There is no difference.—Eds.]

**A Philosophical Problem.**

MESSEES. EDITORS:—Quite a dispute has arisen between the mechanics of this place and myself in relation to the amount of force or power required to move a body at different distances from it. Thus, if a body or weight to be moved is placed two feet from the motive power, less power will be required to move it than when placed twenty feet off. So say the mechanics. I say, deduct the extra weight of chain, belt or pole, or whatever connects the weight to the power, and no extra force will be required to move the weight at twenty feet off. As we cannot settle the point ourselves, we have agreed to refer it to you for a decision.

THOS. J. CORNELL.

Decatur, Ill., July 28, 1865.

[We agree with you exactly.—Eds.]

**To Restore The Hair.**

MESSEES. EDITORS:—I am a machinist and have worked under an iron roof for several years, from the effect of which I have lost a great deal of my hair. If you know of anything that will make the hair grow on my head again please let me know.

W. J. SMITH.

Reading, Pa., Aug. 4, 1865.

[We really sympathize with our correspondent, but we do not know of any article that we can sincerely recommend to promote the growth of his hair. The nostrums advertised for this purpose are generally good for nothing. We advise our correspondent to wash his head every morning and evening with castile soap water, and give the head a thorough rubbing with a linen towel. We have heard this process recommended. It can do no harm.—Eds.]

**A Tool Below the Centers.**

MESSEES. EDITORS:—Will you please answer the following questions:—Can a straight or true taper be turned by a common engine lathe when the point of the tool stands above or below the centers? If not, why?

D. ARTH. BROWN.

Fisherville, N. H., July 31, 1865.

[There is no reason why a true taper should not be turned when the tool is above or below the centers. Not one tool in a hundred coincides with the centers, but no difficulty is found in making a perfect fit.—Eds.]

**Fence-makers, Take Notice.**

MESSEES. EDITORS:—Will you, through the columns of your valuable journal, call attention to the fact that there is now in this State a great field open to the manufacturers of field fence. Thousands of miles of fences have been consumed by the armies during the war. Water power is plenty and timber very cheap. To the inventor or manufacturer of the cheapest and best fence a fortune is in store for him in this State.

E. A. DAYTON.

Alexandria, Va., July 28, 1865.

**A Startling Announcement.**

MESSEES. EDITORS:—It may please you to print the following item of news for the benefit of your readers. I have discovered the origin of gravitation.

WM. ISAACS LOOMIS,

Pastor of Baptist Church.

Martindale Depot, N. Y., July 25, 1865.

[This is the same gentleman who made the discovery that Sir Isaac Newton had made a mistake in regard to the precession of the equinoxes.—Eds.]

**Fruit Drier.**

MESSEES. EDITORS:—If some one who is posted in such matters, will give through the columns of your paper the best plan of a house for fruit-drying many of your Western readers will be much obliged.

W. D. MAYFIELD.

Ashley, Ill., July, 1865



## 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:—

**Let-off Motion for Looms.**—This invention consists in the combination with the mechanism which holds the yarn beam and prevents it from turning spontaneously, of a weight suspended from a sheave which rests in a bight of the warp in such a manner that, by the action of said weight against the mechanism which holds the yarn beam, the warp is set at liberty whenever the loom requires it, and, at the same time, by the weight, all the slack in the warp is taken up and allowed to pass to the loom, as required. The friction consists of a concave conical socket or seat, in the end of the warp beam, in combination with a conical plug, sliding on the axle of the said warp beam, and connected to the lever, which is acted upon by the weight, as above stated, in such a manner that when said lever is left to follow its own inherent gravity, assisted by the action of spiral springs, the conical plug is pressed into the conical seat with sufficient force to hold the warp beam stationary, but, as soon as the lever is raised, the warp beam is released, and a portion of the warp is let off. W. W. Pomeroy, East Hampton, Mass., is the inventor.

**Breech-loading Fire-arm.**—This invention consists in the employment or use of a fixed metallic cartridge case, fastened in the breech block or cylinder, and moved with the same, in such a manner that it enters a short distance into the rear end of the barrel, and prevents windage between the same and the breech block or cylinder; also, in the application of a chamfered sleeve inserted into the face of the breech block or cylinder, and applied in combination with the same, and with the metallic cartridge case, in such a manner that by the action of said chamfered sleeve the cartridge case is guided and held central with the bore of the barrel. The invention consists further in combining with the guard bow two arms or levers—one intended to act on the slotted tail of the oscillating locking wedge, and the other to act on a slot in the rear end of the breech block, in such a manner that by the action of said guard bow the locking wedge is turned up and the breech block made to slide back and turn up to a position convenient for receiving a new charge, or for removing the empty cartridge cases when fixed ammunition is used. W. F. Wilson and Henry Flather, of Bridesburg, Pa., are the inventors.

**Spring Punch.**—This invention relates to a tool for punching holes of different sizes into leather, paper or any other substance or material of a similar nature, and for inserting and heading eyelets. The punches are secured in a head, which revolves between the two arms or prongs of one of the jaws of a pair of nippers, on a pivot which has a firm bracing on both sides of the punch-head, and which, at the same time, forms a guide for the spring catch, that serves to retain said head in the desired position. The other jaw carries a block or anvil, which is secured to it by a thumb-screw, so that it can be revolved and set in any desired position. It is provided with several faces, one of which is covered with sheet brass or other soft metal, to be used for punching, while the other faces are provided with holds and recesses, to correspond to the pins and faces of the heading tools. Peter Bauer, Newark, N. J., is the inventor.

**Cabinet Organ.**—This invention consists in applying porous or perforated material, or woven fabrics, which can be penetrated by air, to the safety-valve of a musical instrument, or to any other aperture for the passage of air, so as to divide the mass or current of air into many parts, and thereby prevent noise from the passage or movement of the air, and also restrain and modify the rapidity and energy of its passage. George Woods, of Cambridge, Mass., is the inventor.

**Gas-fitter's Clamp or Wrench.**—The object of this invention is to provide a gas-fitter's clamp, adjustable to all sizes of plates, whether large or small, within any reasonable limits, and with facility, ease and quickness. It consists in forming the clamp of two shafts, one of which has its outer end made of a hook shape, at a short distance from, and between

which and its handle, is a short slot extending in the direction of its length, having its end toward the handle serrated, or made of a toothed shape, in and through which slot the other shaft is inserted, made of such a size as to be freely moved forward and backward therein, with its edge, which comes in contact with the teeth of the slot, correspondingly toothed or serrated, so that, having first placed the hook-shaped end about and around the pipe upon which it is intended to operate, and then having adjusted the outer end of the other shaft, so as to bear against said pipe, by simply grasping the handle ends of the two shafts with the hands, and moving them toward each other, the outer end of the adjustable shaft can be made to tightly hold and grasp the pipe; the interlocking of its teeth with the toothed slot preventing it from slipping, and serving also as a fulcrum for the same to turn upon. Andrew B. Lipsey, of No. 17 Broadway, New York, is the inventor.

**Machine for Pressing Brick.**—This invention consists in the employment of a horizontal rotating disk or table, provided with cavities, which form the brick molds, and having plungers or followers fitted within them, which are operated by inclined surfaces on an annular track or way. The cavities or molds in the disk or table are provided with hinged lids or covers, and an adjustable bearing is placed over the lids or covers, to keep them firmly down, while the plungers or followers are compressing the clay in the cavities or molds. E. P. H. Capron, of Springfield, Ohio, is the inventor.

## BREAKING OF THE ATLANTIC CABLE.

From Mr. Field's diary it seems that in the course of laying the cable, three times defects were discovered in the insulation after the injured part had left the ship; twice the cable was hauled back on board, and the injured part discovered and cut out; but in the third effort the cable caught in the hawse-hole and was badly chafed, and when this chafed portion came on board it parted, the outer end dropping down into the bottom of the sea. This occurred in a depth of 1,950 fathoms—more than two miles. But even in this great depth the cable was dragged for by a grapnel, was caught and raised 1,200 fathoms, when a shackle of the grapnel rope parted, and the cable fell back to the bottom of the ocean. In a second effort the cable was again seized and drawn up 900 fathoms, when the shackles broke and dropped the cable the second time to the bottom. The account of the third effort we give in Mr. Field's own words:—

THURSDAY, Aug. 10.

At 7 o'clock A. M. we began to lower the grapnel, and at 8:55 had out 2,460 fathoms—all that was on board the ships—and commenced dragging for the cable, and continued to do so, until the evening, when we began to haul in slowly.

FRIDAY, Aug. 11.

At 6 A. M. we finished hauling in the 2,460 fathoms of rope, when the grapnel came up foul with its own chain.

At 11 A. M. we began to lower the grapnel again, and as soon as all the 2,460 fathoms were paid out we commenced dragging until 3:55 P. M., when we began to haul in slowly.

It was soon evident by the great strain that the grapnel had caught the cable.

At 7 P. M., when 710 fathoms had been recovered, the rope parted.

As there was not sufficient rope on board the *Great Eastern* to resume grapneling, it was decided that she should return at once to England.

## MISCELLANEOUS SUMMARY.

N. C. THOMPSON, of Woodstock, Vt., has lately introduced steam as a substitute for hand labor, at his marble works, for the polishing of the stone, gaining by its use a vast saving of time and strength. Large quantities of Vermont marble are annually used at Mr. Thompson's establishment, and also of New Hampshire granite. The Vermont quarries are principally at Rutland and Dorset.

It is reported that the Wisconsin river is a perfect mass of sawed lumber. Millions of feet are lying there with no immediate prospect of getting out, and the lumbermen feel discouraged, and talk of avoiding the trouble hereafter by artificial help, such as making slack-water improvements.

Most persons who have crossed Westminster Bridge of late have doubtless observed the new system of guttering recently laid down. The gutter is of cast iron, about 9 in. wide, and has a raised edge some 3 in. high, which divides it from the road. In this ridge, holes are left at intervals for the surface water from the road to pass through. But such has been the foresight of the engineer, that at the very times when its use is required it is inoperative. This arises from the wheels of vehicles filling up the holes with mud as neatly as a druggist fills his pot with salve. So that, after several hundred pounds have been spent, attendants are required to keep the passages clear with pickers!

**AN INDIAN'S IDEA OF MACHINERY.**—Some chiefs of Canadian Indians, a few days ago, saw a Wheeler & Wilson's sewing machine in operation for the first time. One old chief, with a lamp, watched the motion beneath the table and the rest kept their eyes fixed upon it above, to see there were no "white lies" about it. They then compared notes, threw themselves on the floor and rolled about laughing and crowing out, in Indian, the "Sewing Spirit." They had no idea it was the spirit of man's intelligence which put it in such successful motion.

Among the most recent scientific discoveries in France may be mentioned a method invented by M. Neant for keeping afloat a vessel about to sink, and putting out any fires that may happen to break out on board. His plan is to attach a certain number of balloons made of india-rubber, and inflated with air, to the sides of the sinking vessel. M. Chattenmann proposes to render externally incombustible by white-washing the wood with chloride of lime. This, he thinks, would prevent the rapid propagation of the flames, and allow sufficient time to extinguish them.

The following process of encaustic is given by M. Bocklin:—Moist plaster of paris is painted with water colors as usual. When the design is perfectly dry, it is painted over with a hot solution of wax and resin, and this coating is burnt in with a strong heat. The wax sinking in fixes the color, and gives together with its compound resin a solid transparent surface, which effectually protects the painting from injury by damp or dust, the colors at the same time being greatly heightened and improved.

A new method of fastening brooches and other similar articles of use and ornament, is due to Mr. Blackburn, a Birmingham manufacturer. The fastening of the brooch is relieved from undue pressure in any one part, and instead of a soldered joint, so liable to rupture, the hinge is formed by a coil of the metal of which the pin is made, and so acquires the necessary spring by fitting into a strong socket. The sharp end of the pin does not project over the body of the brooch, but is held secure within a projecting shield.

The Lee Fire-arms Co. have established at Milwaukee a factory for making rifles. A large amount of excellent machinery has been put in, and some eighteen or twenty hands are now employed in the manufacture of guns and additional machinery. The number of hands will soon be considerably increased. The company has a contract with the Government for some of its guns, which will give it a good start in business.

**MANUFACTURE OF MAGNESIUM COMMENCED.**—The *Boston Commercial Bulletin* says:—"The American Magnesium Co., of this city, have just commenced the manufacture of magnesium from dolomite or magnesium limestone by the Sonstadt method, and are producing the metal, both crude and refined, in considerable quantities. We do not doubt but that, as in other matters, perseverance will conquer all obstacles and insure its success."

The rotary steam rag-bleaching boiler in Crane's paper mill, at Dalton, N. H., exploded on the 31st ult. with great force, jamming a costly paper-making machine into a worthless mass. The entire damage cannot be less than \$6,000 or \$7,000. These accidents are not uncommon, and it would seem worth while to take steps to prevent them. Rags are bleached by steam at a pressure of 60 or 70 pounds.

The captain of a vessel now unloading in New London has a hive of bees which came on the vessel at City Point in May last. When in port the bees go ashore for food; when at sea he feeds them with molasses.



**Improved Compression Faucet.**

This faucet has the great merit of affording a large opening for the passage of fluids; much greater, in fact, than can be obtained in faucets of the common kind. It is simple in construction, and not liable to wear leaky, since the pressure of the fluid tends to make the faucet tighter, instead of forcing the valve or plug away from its seat, as in the common faucet; when once properly seated the valve in the faucet will always be tight.

The engravings represent a faucet in section and perspective. The section shows the valve, A, and its seat. This valve works in the chamber, B, which screws on to the body, C, of the faucet. The valve seat is of rubber, and is confined between the chamber and the body, C. The valve is operated by a key, D, as usual, but this key is cranked in the center, as at E, so that when the key is turned the crank will rise and push the valve off its seat, thus allowing the liquid to flow out. The key is packed at each end with a rubber washer, F. The engraving shows a five-eighth faucet, and, as may be seen by the proportions, the original is but little larger than this engraving. The pressure of the liquid on the valve always keeps it tight. For hot water a different substance, not liable to change, is employed for the seat. We consider it a valuable improvement.

A patent is now pending on this faucet through the Scientific American Patent Agency, by John Broughton. For further information address Messrs. Broughton & Oakman, No. 41 Centre street, New York.

**Improved Oscillating Engine.**

The annexed engraving represents one of Carter's ten-horse power oscillating steam engines. The advantages claimed for this invention are as follows:—It has a plain slide valve, working on a three-ported seat, inclosed in a steam chest; consequently there are no working joints, so common in some kinds of oscillating engines, to wear loose and leak, and no set screws required to keep the cylinder in position. The valve movement is simple, compact and durable.

In the engraving, A is the steam chest, and B the valve stem, which runs through the right-angled arm, C, and is made adjustable thereon by means of two nuts on the top and bottom of the arm. In the link, D, there is a composition box, which is connected to the arm, C, with a pin. When the cylinder oscillates it causes this arm, C, to travel in the stationary link, D, giving a reciprocating movement to the valve. This movement, the inventor says, is remarkably quick, and the engine starts from very near the center easily, without lead. The steam is let in and out through the trunnions, as usual, which are both of the same size. These engines are in successful operation, and prove entirely satisfactory.

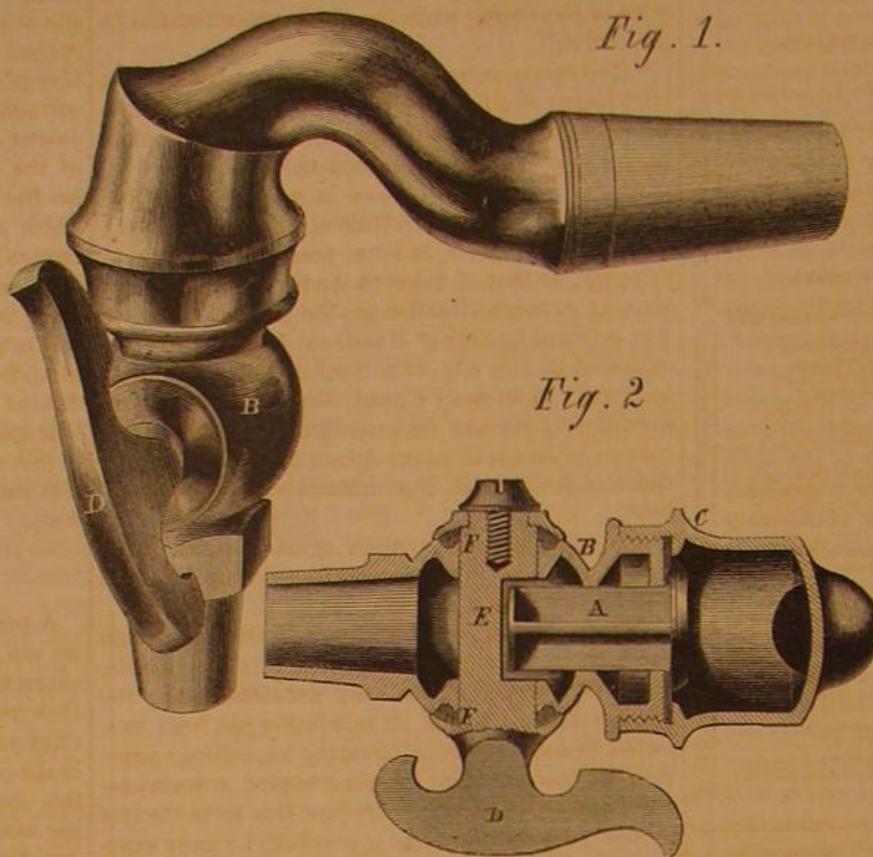
It was patented through the Scientific American Patent Agency on July 25, 1865, by Henry T. Carter, of Portland, Maine, to whom all orders and communications must be addressed.

**TO DESTROY COCKROACHES.**—Dr. Chabert, of Hoboken, has invented a first-rate remedy against cockroaches—this great plague of many of our households—which he offers to the public gratuitously. He simply pays a penny to his children for each cockroach they catch, dead or alive, a reward large enough to bring certain destruction to every straggler that may find his way into his dwelling.

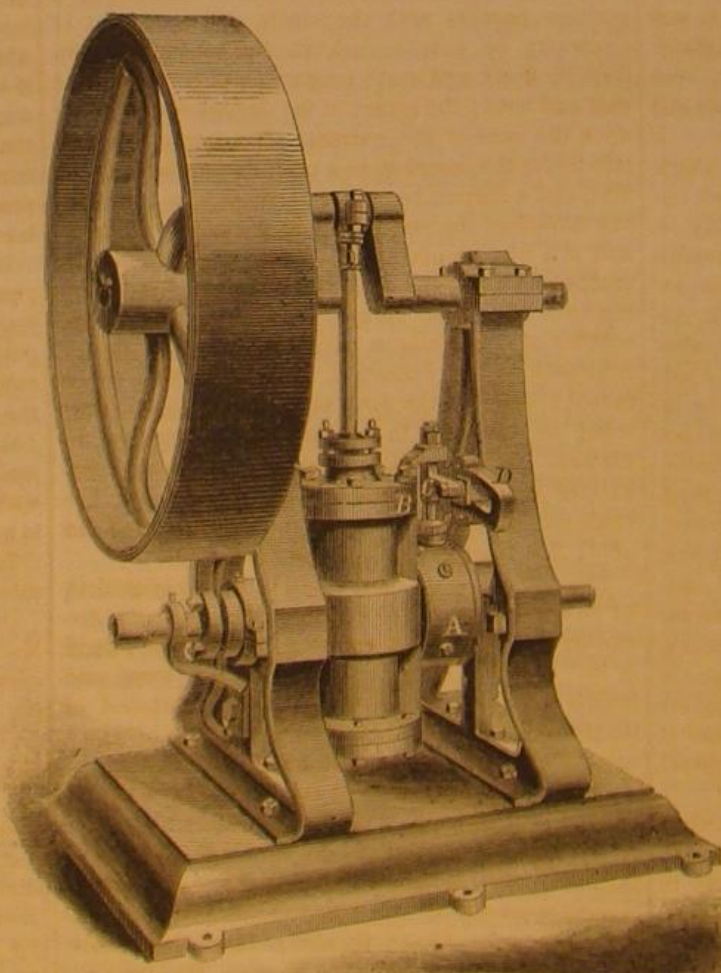
[We get this statement from a correspondent; an easier plan would be to poison them.—Eds.]

**Cracking of Bells.**

"Several years ago," says a traveler, "I paid a visit to the church at Hanbury, near Burton-on-Trent, and ascended the tower, in which a new set of bells had been recently hung. I was then informed that, on the completion of the restoration of the church, the workmen employed obtained permission to sound

**BROUGHTON'S COMPRESSION FAUCET.**

the bells in honor of the architect. One of them, by way of a practical joke, thinking to deaden the sound, suddenly clasped his arms around one of the bells at the moment when his comrade struck it. He succeeded beyond his wishes; for the bell cracked on receiving the blow, and had to be recast. On some

**CARTER'S OSCILLATING ENGINE.**

surprise being expressed at this accident, the founder observed that a piece of packthread tied tightly round a bell would have produced the same result. The story made an impression on my mind at the time, and I am now glad that I remember it."

[Is this true?—Eds.]

**Unique Pocketbook.**

A patent has been granted to Mr. J. T. Dubber for an improvement in pocketbooks which deserve, to be noticed by the readers of the SCIENTIFIC AMERICAN and the public in general. Every person using a pocketbook has probably experienced the difficulty that attaches to the ordinary fastenings, which consist either of catches or of elastic cords or straps; by these the closing flap is liable to open accidentally, often causing the loss of a portion or the whole of the contents of the pocketbook. This difficulty exists, particularly, if the pocketbook is opened for the purpose of taking out bills or papers from that part which is intended for holding such things. During this operation the pockets made to hold coin or fractional currency remain open and unprotected, and the contents thereof are liable to drop out and get lost. By Mr. Dubber's invention this difficulty is obviated, the closing flap being provided with a spring which holds the pocketbook, or any portion thereof, firmly closed, and the loss of the contents of the same is avoided. Further information in regard to manufacturers' licenses, or State or county rights, may be obtained by addressing the inventor, Mr. J. T. Dubber, 206 Broadway, New York.

**Railway Grease.**

When on a journey, and stopping at one of the larger stations, those passengers who do not care to go into the refreshment room have their attention riveted on the man with the

yellow ointment very like pineapple ice cream. He gropes along by the side of the train, lifts up certain covers above the axles of the wheels, and at a glance sees whether the axle has sufficient lubricating food to last to the next principal station. If the axle is getting hungry, he digs a wooden knife into his grease box, takes up a tempting lump of cream, puts it into the axle box, shuts down the cover, and trots on to the next pair of wheels. It would be equally a mistake to suppose that this ointment is coarse in quality or small in quantity. The object in its use is to lubricate the rubbing surfaces of axles, in order to bring friction to a minimum—and a very nice adjustment of ingredients is necessary to insure that the substance shall produce the desired result without leaving any grit, and without being too hard in cold weather or too soft in warm. If we choose to touch a little of this ointment we shall find that it is beautifully smooth and uniform. It was only after many experiments that the right proportions of ingredients—tallow, palm oil, soda, resin, water, and possibly one or two others—were determined. Some of the companies buy their grease ready made; but the giants make their own in huge coppers. Into these steam is admitted from a boiler. The hot liquor (for the mixture is nearly liquid when hot) fizzes and bubbles and tosses about, until everything is thoroughly mixed with everything else. Then it is transferred to large flat wooden vessels, where it is stirred about while cooling. When cooled, it is shoveled into well-made barrels or casks, and these barrels are sent to all the principal stations, where the grease men administer the yellow food to the axle boxes. The substance

is required by tons weight every week on the longer lines of rail.—*All the Year Round.*

We would call the attention of capitalists seeking an investment to the India-rubber Works advertised in the back part of this number.



# THE Scientific American.

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## TWENTY YEARS AGO.—VOLUME I, NUMBER 1.

On the 28th day of August, just twenty years ago, Rufus Porter issued to the public the first number of the SCIENTIFIC AMERICAN in a brief address, wherein he announced to the sovereign people that he should advocate the pure christian religion, without forming any particular sect, and should develop the beauties of nature which consists in the laws of mechanics, chemistry and other branches of natural philosophy, etc. The present editors and proprietors assumed the control of the paper on July 30, 1846. It was then a good-sized folio of four pages—and in glancing over those pages we find some items that, seen in the light of the present day, are very curious and interesting; we give a few specimens:—

"Morse's Telegraph.—This wonder of the age, which has for several months past been in operation between Washington and Baltimore, appears likely to come into general use through the length and breadth of our land. Arrangements are already made for extending the lines to Philadelphia, New York, Albany, Buffalo, Springfield, Boston, and various other cities and sections. Hon. Amos Kendall, ex-Postmaster General, has taken the management of the invention—whether as proprietor or agent we are not informed—while the inventor is on a tour to Russia. We shall take an early opportunity to give our readers a full and minute description of this invention, with explanations and illustrations of its principles; but in consequence of the press and variety of matter which presses on this, our first number, we are constrained to defer it. We will add the remark, however, that it is contemplated by the merchants of our Western States to communicate their orders for goods, etc., by means of the telegraph, instead of abiding the slow and tedious progress of railroad cars."

"The Steamship Great Britain.—This mammoth of the ocean, which has recently arrived from Liverpool, has created much excitement here as well as in Europe, being, in fact, the greatest maritime curiosity ever seen in our harbor. She was built by the 'Great Western Steamship Company,' at Bristol, England. Her keel was laid in July, 1839, and she was launched in July, 1844, with her engines and machinery on board. She is composed entirely of iron, which renders her perfectly safe against accidents by fire." Then follows a statement of her dimensions.

"Centrifugal Clarifier.—Mr. Joseph Hurd, of Shoreham, Vt., has secured Letters Patent for an apparatus for separating or clarifying liquids by applica-

tion of centrifugal force. It is a well-known fact that mucilage or sugar, as well as mineral and saline substances, have a greater specific gravity than water, though the particles thereof will not readily separate from water by mere force of gravity, but when a mixed fluid, or turbid water, is put into a violent rotary motion, in a cask or cylinder, the centrifugal force will drive the heavier particles to the sides of the vessel, while the clear water remains in the center."

"Electro-magnetic Light.—There is much talk about introducing electro-magnetic light, as a substitute for oil or gas; when we learn more about it we shall be free to communicate particulars."

"Aerial Navigation.—There is a long description, illustrated by a cut, of a balloon for navigating the air, though different in form, precisely the same in principle, as that of Solomon Andrews, which is attracting so much attention at the present time. It was invented by Signor Mussi, an Italian, and was exhibited in this city to a "select and fashionable audience," at 50 cents a head. Mr. Porter, having an invention of his own for propelling a spindle-shaped balloon by means of screws driven by a steam engine, ridicules the plan of Signor Mussi with great bitterness.

"List of Patents.—A portion of one column is occupied with a list of the patents issued from the 1st of July to the 16th of August.

"Electro Plating.—This incomprehensible art, which has been in use about three years, is truly valuable, and must prevail extensively, notwithstanding the disadvantage to which its reputation has been subjected, in consequence of the many impositions practiced on the public by the unprincipled speculators. Having been the first to introduce this art in the city of New York, we have had opportunity for more experience in the business, probably, than any other person in the country; and can say with confidence, that either gold-plating or silvering can be executed by the electro process with greater beauty and permanence than can be done by the old process, yet at less than one-half the expense."

## THE WAY THE DISTANCE WAS MEASURED TO THE FAULT IN THE ATLANTIC CABLE.

If a wire be laid upon a mariner's compass, in a position parallel with the needle, and a current of electricity be sent through it, the needle will turn from its north and south position, partly toward the east and west; the extent of the deviation depending upon the force of the current. If a second wire be laid under the compass, in a position parallel with the first, and a current be passed through it in the opposite direction, the needle will be deviated still more, and if a wire properly insulated be wound round the compass in a north and south direction, the deflecting force of a given current is in proportion to the number of convolutions. With a given number of convolutions the deflection bears a certain ascertained relation to the force of the current; the force being in proportion to the sine of the angle of deflection. Consequently a needle thus arranged constitutes an instrument by which the force of a galvanic current passing through the wire may be measured; it is therefore called a galvanometer.

The force of a galvanic current is diminished by its passage through a long circuit; the force of a given current being in inverse proportion to the length of the circuit. Hence, if we know the force and length of a given circuit, and it is then shortened or lengthened, we can ascertain its new length by measuring its force by a galvanometer.

While the cable was being laid, a current was frequently sent through it from the land in Ireland, a connection being made between the further end of the cable coiled in the ship and the water, so that the current went out by the wire and completed its circuit by the sea. Electricity always takes the shortest path, or rather the path which offers the least resistance, and when that part of the cable which had a bit of wire pricking through the gutta-percha to the conducting core entered the ocean, the current ceased to run its dizzy round through the miles of coil in the tanks of the *Great Eastern*, but, slipping out on the bit of wire, it cut straight back to the coast of Ireland. This shortening of the circuit increased the force of the current, which was immediately indicated by the galvanometer, the extent of

the variation in the needle showing the distance at which the insulation was broken.

The most sensitive galvanometer is made by two needles, one slightly more powerful than the other, passed in a parallel position transversely through a straw, with their poles reversed, the directing force of the earth upon the more powerful needle being nearly balanced by the same force acting in the opposite direction upon the other. The needles thus arranged are suspended under a glass receiver by a fiber of unspun silk, and the lower needle only is surrounded by the coil. It is said that in the galvanometer employed in laying the cable the indications of the deflections were multiplied by having the needles carry an exceedingly thin, light mirror, upon which a beam of light was thrown; the slightest change in the position of the needles was then made manifest by the movement of the reflected beam along the wall.

It is proper to state that this explanation is not given from definite knowledge of what was actually done at Valentia, but as an inference from the fact that the length of electric circuits may be measured in this way, and from a remark by the *London Times*, that the locality of the fault was found by resistance tests.

## THE EXPANSION CONTROVERSY.

A personal controversy is something with which we will have nothing to do. An examination of the character and reputation of G. V. Fox and E. N. Dickerson, or of any other person, may be a suitable employment for political journals, but is out of place in the columns of a scientific paper. But, so far as this dispute has a bearing upon the vexed question of the most economical measure of expansion in working steam, it comes within our province. As this question, in consequence of the controversy, is now attracting general attention in the community, it may interest many of our readers, who are not engineers, to know what are the leading facts in relation to it.

If a cubic foot of air be suffered to expand to a volume of two cubic feet, and its temperature be kept constant, its pressure will be reduced one-half. The same law applies to all permanent gases, and this is the famous Mariotte law—half the volume, double the pressure. An essential condition is that the temperature be kept constant. Tyndall contends that when air expands, without doing any work, as when it expands into a vacuum, its temperature is not reduced by the expansion; but all physicists are agreed that if the air in expanding performs work—overcomes resistance—it is cooled, and, consequently, its pressure is reduced to less than that assigned by the law.

It was formerly taught in the books that steam expanded in accordance with the Mariotte law, but it was discovered many years ago that so large a portion of the steam is condensed into water as to cause a very wide departure from this law. What the amount of this condensation is—to what extent it balances the work theoretically due to expansion, and, consequently, whether there is economy in working steam through large measures of expansion—is a problem which has proved to be one of the most difficult of solution of any that has occupied the attention of philosophers.

One the 18th of November last, Professor W. J. Macquorn Rankine, of Glasgow University, in a communication to this paper, stated the law of the expansion of steam under five different conditions, concluding with the case of a steam engine, in these words:—

"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."

The great compeer of Rankine, in this department of physics, is Regnault, of France. In a paper published in the London and Edinburgh *Philosophical Magazine*, October, 1854, he thus states the difficulties of the problem:—

"For my own part, I have long labored to bring together the experimental data by means of which the theoretical motive power produced by a given elastic fluid, which undergoes a certain change of volume, as well as the quantity of heat which becomes latent by this change, might be calculated *a priori*. Unfortunately these data are very numerous, and most of them can only be determined by extremely delicate and difficult experiments."

That the problem of the force of expanding steam in a steam engine, which has baffled the genius of all the eminent physicists of the world, including Rankine and Regnault, with their delicate apparatus, with their exhaustless patience, and with their masterly knowledge of the conditions—is to be determined by two engines of different construction, with different boilers, placed on boats with different wheels, and tumbling about among the billows of the Atlantic, is simply ridiculous.

But, if Mr. Forbes has constructed a propelling apparatus, embracing engine, boiler and wheels, which will, under the same conditions, with a given quantity of coal, propel a vessel of given size and form more rapidly than the propelling apparatus constructed by the Government, most assuredly he ought to have an opportunity to demonstrate it; and when the legal questions in relation to the contract are settled in a proper manner, we hope the proposed trial will take place. If Mr. Forbes's apparatus should prove to be superior to that of the Government, then steps should be taken to ascertain wherein the superiority lies, whether in the engine, boiler, or wheels, and the improvement should be adopted.



ISSUED FROM THE UNITED STATES PATENT-OFFICE

FOR THE WEEK ENDING AUGUST 15, 1865.

Reported Officially for the Scientific American.

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

49,358.—Manufacture of Gas for Heating and Illuminating Buildings, and for Other Purposes.—Thomas Arnold, New York City:

I claim a gas-generating apparatus, in which superheated steam is passed through incandescent carbon, and thence through a chamber immediately over the carbon, into which petroleum or other hydro-carbon is admitted, and the gaseous products conveyed away and burned below such apparatus, as specified.

I also claim the arrangement of the steam passages, *g*, carbon chamber, *a*, chamber, *c*, and pipes, *e*, *f*, for the purposes and as specified.

49,359.—Washing Roller.—J. E. Atwood, Lynn, Mass.:

I claim the hand washing roller, constructed substantially as described, with a handle, roller, armlet and frame.

49,360.—Washing Machine.—J. E. Atwood, Lynn, Mass.:

I claim the frames, *A*, *C*, constructed directly together at one end, and connected at the opposite end by braces, *e*, and springs, *f*, in combination with the cylinder or drum, *B*, and roller, *D*, substantially as herein specified.

49,361.—Wringing Machine.—J. E. Atwood, Lynn, Mass.:

I claim the combination of the concave wooden roller and the convex rubber-covered roller, substantially as used for the purpose described.

49,362.—Sinking Deep Well Tubes.—H. R. and M. T. Barnes, Watkins, N. Y.:

We claim the employment of an interior rod or tube, *B*, in combination with a water pipe, *A*, in driving into the earth, substantially as and for the purpose herein set forth.

Second, In combination with the rod or tube, *B*, and pipe, *A*, we also claim the adjustable shoulder, *C*, substantially as specified.

Third, In combination with the rod or tube, *B*, and pipe, *A*, we also claim the detachable point, *D*, so arranged that when the pipe is driven in place, the point may be forced a little lower to make a depression in the earth, substantially as described.

49,363.—Sugar Evaporator.—Thompson C. Bartle, Independence, Iowa:

I claim the combination of the steam coil, *F*, with one or more pans, *D*, in connection with the boiler, *C*, substantially as set forth.

49,364.—Spring Punch.—Peter Bauer, Newark, N. J.:

I claim the revolving anvil, *E*, provided with one or more faces for the punches in the head, *C*, and with socket corresponding to the heading tools in said head, substantially as and for the purpose described.

49,365.—Flour Bolt.—John Beall and Samuel K. Schaffer, Decatur, Ill.:

We claim the application to a bolt reel of a series of pivoted arms, provided at their ends with weights, *c*, *c'*, the ball or weight, *e*, at one end of the arms being heavier than the balls or weights, *c'*, at the opposite end, and all arranged to operate in the manner substantially as an for the purpose set forth.

[This invention relates to a new and improved knocking device to be applied to flour bolts, for the purpose of keeping the same clean or open, so that the flour may readily pass through them.]

49,366.—Water Gage for Steam Generators.—Henry Belfield, Philadelphia, Pa.:

I claim the combination and arrangement of the cap, *G*, glass tube, *F*, spiral spring, *J*, nut, *I*, elastic packing, *e*, and tubular projection, *H*, as herein set forth.

49,367.—Manufacture of Felted Yarns.—John H. Bloodgood, New York City, and Moses A. Johnson, Lowell, Mass.:

We claim a felted thread or yarn composed of felted and non-felted materials, the same being a new article of manufacture.

49,368.—Machine for Making Pipe Core.—William and George Braid, New York City:

First, We claim the combination of a rotating center-piece, *G*, rotating pressing roller, *B*, and templet or scraper, *J*, the whole arranged and operating substantially as and for the purpose herein specified.

Second, The hopper or feeding box, *B*, with its vibrating bottom, in combination with the compressing roller, *B*, and center-piece, *G*, substantially as and for the purpose herein described.

Third, The arrangement of the center-piece, *G*, in bearings in the two connected levers or rockers, *I*, *L*, and in combination with a movable clutch, *K*, and driving gear, *L*, substantially as and for the purpose herein specified.

49,369.—Loom.—John Braun, Philadelphia, Pa.:

First, I claim the oblong slot, *d*, in the end of the working beam, *C*, in combination with the eveners, *D*, *D'*, and levers, *I*, *K*, constructed and operating substantially as and for the purpose set forth.

Second, The manner described of supporting and of operating the eveners, by connecting them at or about their centers, the one with the working beam, *C*, and the other with the working beam, *p*, which receives its motion from the one connected to the main beam, substantially as described.

49,370.—Sifting Shovel.—J. P. Buckland, Holyoke, Mass.:

I claim the use of the wire netting in the construction of sifting shovels, the frame or skeleton of which is composed of cast metal.

49,371.—Revolving Crutch Feet.—J. G. Bugbee, Bangor, Me.:

I claim a reversible crutch foot, arranged and operated substantially in the manner described and for the purposes specified.

[This invention consists in hanging and arranging a crutch foot, formed upon one end with one or more sharp points or projections, and upon the other with a flat or even surface, within the lower end of the crutch, in such a manner that it can be easily revolved therein, and thus adapted to the condition of the sidewalk upon which the person using the same is walking.]

49,372.—Wringing Machine.—J. D. Burdick, Ashaway, R. I.:

I claim, First, In combination with the two rollers, *C*, *C'*, the supplemental shaft, *E*, provided with pinions, *d*, *d'*, which gear into pinions, *c*, *c'*, on the lower roller shaft, *a*, and the elastic belt or straps, *H*, all arranged to operate substantially as set forth.

Second, The combination of the double side-pieces, *A*, tenons, *J*, and socketed clamps, *K*, *L*, *M*, all constructed and arranged as specified.

[This invention is designed to obviate the difficulty attending the spreading apart of the rollers of wringing machines, and the consequent separation of the gearing by which the rollers are connected or driven one from the other—a contingency of frequent occurrence, owing to the unequal thickness of the layer of clothes passing between the rollers. The invention has further for its object an improved mode of securing the machine to the wash tub.]

49,373.—Ventilator for Houses.—Benajah J. Burnett, Mount Vernon, N. Y.:

I claim, First, The combination with a ventilator, constructed, arranged and applied as described, of the regulating valve or valves, operating substantially as and for the purpose herein fully described.

Second, The air distributor, *F*, in combination with the air ducts, *a*, *b*, *c*, and deflectors, *r*, *r'*, substantially as and for the purpose herein specified.

Third, The shield, *G*, extended over the upper outer opening, *o*, and deflector, *r*, and open at the sides, substantially as and for the purpose herein set forth.

49,374.—Ventilator for Ships, Etc.—Benajah J. Burnett, Mount Vernon, N. Y.:

I claim, First, The combination of the stationary or fixed partitions, with the longitudinally movable partitions or wings, arranged and operating substantially as and for the purpose herein described.

Second, The combination of the sidelight or shutter with the movable partitions or wings, substantially as described.

49,375.—Beehive.—Tobias Burris, Fieldon, Ill.:

I claim the combination of the oil drawer or receptacle, *D*, perforated bottom, *C*, and passage tube, *E*, with the hive, *B*, substantially as and for the purpose herein set forth.

49,376.—Brick Machine.—E. P. H. Capron, Springfield, Ohio:

First, The rotary mold wheel or table, *D*, in connection with a bearing, *M*, and inclined adjustable section, *L*, and rising and falling plungers or followers, *F*, for the purpose of molding or pressing brick, as set forth.

Second, The particular arrangement of the annular way or track, *H*, section, *I*, and the bearing, *M*, as shown, whereby the lids of the molds are held down by the bearing, *M*, while the pressure is given by the section, *I*, as described.

Third, Arranging the section, *I*, as shown, or in any other equivalent way, so as to render the same capable of being adjusted to regulate the pressure on the clay, in the molds, as set forth.

Fourth, The friction rollers, *G*, at the lower ends of the plungers or followers, *F*, and the friction rollers, *L*, in the lids or covers, *K*, for the purpose specified.

Fifth, The hinged lids or covers, *K*, provided with the arms, *d*, *d'*, in connection with the projections, *e*, *e'*, attached to the framing, substantially as and for the purpose set forth.

Sixth, The lips, *i*, *i'*, at the lower ends of the plungers or followers, in connection with the plate, *b*, or its equivalent, attached to the inclined plane, *b'*, for the purpose of lowering or drawing down the followers, as set forth.

Seventh, The lubricating device for the plungers or followers, the same consisting of grooves, *g*, made in the plungers or followers, and provided with strips of cloth or other absorbent material, substantially as described.

49,377.—Weighing Apparatus.—Benj. Churchill, Wareham, Mass.:

I claim the construction of its beam and movable weight, and the arrangement of knife-edge bearings relatively to the beam, substantially in manner as explained, so as to enable the weight to be moved across the axis of motion of the beam, as and for the purposes specified.

I also claim the arrangement of the shot-receiving chamber or vessel with the platform, as described.

49,378.—Animal Trap.—J. W. Churchill, Pittston, Pa.:

I claim the combination of the counter-balanced platform bar, *I*, *I'*, gate, *B*, and their rod and lever connections, operating in combination with the platform stop and the box, *A*, as and for the purpose described.

[This invention consists in providing a rat and mouse trap with a door, arranged in such a manner that it will remain open at all times, whether an animal is in or out of the trap, but will close whenever an animal attempts to get out of the same. The object of the invention is to obtain a simple and efficient trap, which will always be set, and will not be liable to get out of repair.]

49,379.—Piston Packing.—David Clark, Hazleton, Pa.:

I claim the improvement in piston packing herein described, the same consisting in forming in and extending entirely around the periphery of the piston a series of one or more grooves or channels, in combination with one or more expansible metal levers upon each end portion of the said periphery, arranged and operating substantially as and for the purposes specified.

[This invention consists in forming around the periphery of the piston a series of parallel grooves or channels, in combination with one or more expansible split metallic wings placed upon each end of the piston, and so arranged that the steam can enter between them and the piston, whereby they are caused to be thrown out or expanded, as it were, sufficiently for the piston to fit its cylinder with the requisite tightness insure its operation; these grooves also serve as so many channels or receptacles for the water from the condensed steam, penetrating thereto when steam is first admitted to the cylinder, whereby the sides of the cylinder are always kept moistened and lubricated, thus preventing the piston from cutting it.]

49,380.—Water Wheel.—J. M. Clark, U. S. A.:

I claim the two wheels, *C*, *C'*, provided with buckets, *a*, as shown, and keyed on one and the same shaft, *B*, in combination with the block, *A*, provided with the water passages, *b*, *c*, *d*, and escape passages, *e*, all arranged to operate substantially as and for the purpose set forth.

[This invention relates to a new and improved water wheel, which is also applicable for use with steam as a motor. It consists in the employment or use of two wheels, placed on one and the same shaft with a block between them, having water ways or passages made in it.]

49,381.—Curtain Fastening.—John R. Cook, Winsted, Conn.:

I claim a curtain fastener the elastic or flexible band, substantially as and for the purpose described.

49,382.—Composition for Filling the Pores of Wood.—DeWitt C. Cooley, Chas. F. Smith and C. E. Bradley, Aurora, Ill.:

We claim a compound for filling wood, made of the ingredients herein described, and mixed together in about the proportions and substantially in the manner set forth.

49,383.—Treating Glue Stock.—Chas. W. Cooper, Brooklyn, N. Y.:

I claim treating the residuum of glue stock, after the glue has been extracted, with sulphuric or other acid, and removing the grease set free by such acid, substantially in the manner described.

49,384.—Machine for Pressing Bonnets and Hats.—Edwin Copleston, Wrentham, Mass.:

First, I claim in machines for pressing hats and bonnets, the combination of the traveling bed, *B*, the frame, *C*, which revolves upon it, the segment ratchet, *S*, with a hat block, *W*, the said plates being constructed and operated substantially as and for the purpose above described.

Second, I also claim the combination of the parts mentioned in the preceding claim, which presents the hat block in different positions with the arms, which carry the flats, and with the revolving upright shaft, *L*, the said arms and shaft being constructed and operated substantially as above described.

[The object of this invention is to produce a machine which will enable the operator to adjust the parts so as to press either bonnets or hats; also, to save the expense and trouble of the present mode of working, which requires three machines to complete the pressing of a hat; also, to decrease the expense of the castings and other parts of the machinery used in this manufacture.]

49,385.—Car Coupling.—Joseph Couch, Harrison, Me.:

I claim the lever, with the lip and suspension bar attached, in combination with the fulcrum and rest, substantially as described and for the purposes specified.

49,386.—Coupling for Drill or Pump Rods.—John R. Cross, Chicago, Ill.:

I claim lapping the contiguous ends of the two rods to be coupled together past each other and cutting a screw thread thereon which shall run continuously from one to the other in combination with a sleeve or nut working in the manner and for the purposes set forth.

49,387.—Tire Machine.—Chauncey L. Crowell, Peoria, Ill.:

I claim the bar, *a*, which connects the shear with the movable slide as shown and described.

49,388.—Horse-shoe Calking Vise.—Ford B. Curtis, Gardiner, Me.:

I claim the horse-shoe calking vise, constructed with the caulking forming recess or slope, *c*, in one of its jaws and having its other jaw extending above such recess and arched substantially as and for the purpose specified.

49,389.—Plow.—Richard Delighton, Jr., Fairweather, Ill.:

I claim the plow frame constructed of the two beams, *A* and *A'*, the cross piece, *B*, the posts, *D* and *D'*, and handles, *C*, *C'*, substantially as and for the purpose set forth.

49,390.—Fruit Basket.—John H. Doolittle, Derby, Conn.:

I claim the combination of the bent strip having its ends interlocked and bottom board with the surrounding and retaining bands, the whole arranged to constitute a box or basket, substantially as and for the purpose set forth.

I also claim sustaining the bottom of the basket by means of a band, *I*, passed around the body of the basket and through slots, substantially in the manner set forth.

49,391.—Rotary Engine.—Henry Durre, New York City:

I claim the adjustable cylinder, *B*, with its manner of adjustment, in combination with the reversible steam cocks, *K*, *K'*, and steam and exhaust pipes, *e*, *f*, together with the rotary piston with centrifugal valves, substantially as and for the purpose described.

49,392.—Cane Juice Evaporator.—Walter Edgerton, Spiceland, Ind.:

I claim, First, Supporting the coupled pans, *B*, *B'*, by the flanged sleeve or center, *a*, or its equivalent, carried by the standard, *C*, and operated to raise the pans by the hand lever, *e*, substantially as and for the purpose set forth.

Second, Coupling the pans, *B*, *B'*, together with an inclination relatively to each other, in the manner and for the purpose described.

49,393.—Ship Pump.—Jacob Edson, Boston, Mass.:

I claim, First, The combination and arrangement of the head of the pump, formed as described, with the collar or deck plate, the two forming a self-adjusting joint that enables the pump to be set and fastened at any described inclination, as set forth.

Second, The lower valve box or support, formed with a series of prongs sprung into and holding with an elastic force upon the valve seat, as described.

Third, The combination of a wedge-shaped valve box or support, with a seat having two different tapers for the purpose of holding the valve box or support firmly and yet allowing of its easy removal for repairs, as described.

Fourth, A flexible disk valve so arranged with regard to its seat, and a suitable support as when closed to cover the space between the said seat and support, and to play independently of the latter, as described and for the purpose specified.

49,394.—Repeating Action for Pianos.—Ferdinand Farho, Louisville, Ky.:

I claim the double notches, *a*, upon the hammer butt, *b*, in combination with the bracket, adjustable pad, *e*, *f*, and jack, *B*, all constructed, arranged and employed in the manner and for the purposes herein specified.

49,395.—Row Lock.—Ira C. Flagg and F. W. Flagg, Middletown, Conn.:

I claim the circular groove, *d*, and slot, *e*, in the stem of the horns, in combination with the pin, *c*, and socket, *c'*, constructed and operating substantially as and for the purpose described.



## 49,396.—Machine for Cutting and Grinding Fodder.—

Isaac Fulton, Madison, Pa.:  
I claim the arrangement of the disk, A, flexible and adjustable plate, B, pulleys, C and D, belt, E, and bonnet, F, the whole being arranged, constructed and operating substantially as herein described and for the purpose set forth.

## 49,397.—Winding and Setting Watches.—F. A. Giles, New York City:

I claim the combination with the vibrating yoke plate, D, carrying the two wheels, E and G, one of which is arranged to gear with the wheel, E, on the winding arbor, and the other with the cannon pinion of a wheel, C, having a series of teeth, E, on its periphery, which gears with the wheels, F and G, and a series of contrate teeth, C, which gears with a spur wheel, B, on the spindle passing through the stem, the whole arranged and operating substantially as herein described.

## 49,398.—Cupboard Latch.—Benjamin P. Grover, Holyoke, Mass.:

I claim the double guard, e, having a central and end stops, f, f, substantially as described.  
Second, I claim the employment of the thumb piece, g, in combination with the guard, e, and latch, b, substantially as and for the purpose described.

## 49,399.—Piano.—Anthony Gunther, Philadelphia, Pa.:

First, I claim the second vibrating bridge, A, as herein shown and described.  
Second, The combination of the vibrating bridge, A, with the second sounding board, c, as herein shown and described.

## 49,400.—Car Truck.—C. H. Hall, New York City:

First, I claim attaching the front and rear wheels in pins to the bars, D, D, arranged parallel with, and pivoted to, the sides of the truck frame, substantially as set forth and for the purpose described.  
Second, The iron frames, A, B, C, E, on which the car rests, cast in a single piece, substantially as and for the purpose described.  
Third, A truck wheel with an annular groove each side of the central partition, O, in combination with two sets of anti-friction balls, a fixed axle, and side washers, and the iron frame, A, B, C, E, substantially as and for the purpose described.

Fourth, In a series of friction balls, the arrangement alternately of larger and smaller balls, when combined with a truck frame, substantially as and for the purpose described.  
Fifth, The hollow axle, S, provided with an outer flange, n, in combination with the bars, D, truck wheel, and anti-friction balls and truck frame, substantially as and for the purpose described.

Sixth, The removable part, n, of the axle, and the washer, M, cast in one piece, in combination with the truck wheel, L, and anti-friction balls and truck frame, substantially as and for the purpose described.

## 49,401.—Banjo.—Frederick W. Harlass, New York City:

I claim the rings, b and c, within the cylinder of the banjo, pressed apart by screws to strain the head, as specified.  
I also claim the ring, f, in combination with the rings, b and c, and cylinder, d, fitted and employed as and for the purposes specified.

## 49,402.—Machine for Drying and Pressing Leather.—George Harvey, New York City:

I claim, First, In combination with the rollers, D, D2, the regulating screws, J, and J2, plates, I and I2, and springs, b2, when the same shall be constructed, operated and combined, substantially as and for the purpose specified.

Second, In combination with the same, I claim the use or employment of the journal, C, supporting a roller and drainer, L, for the purpose herein fully set forth.

## 49,403.—Sheep Rack.—Charles M. Hicks, Rushville, New York:

I claim, First, The sides, B, B, attached to the framing, substantially as shown, to admit of swinging outward from the lower edges of the boards, A, A, and also of being raised and lowered to admit of being fastened to, and unfastened from, the rack, as described.  
Second, The end pieces, C, in connection with the sides, B, to form the ends of the troughs when the sides are down or in a closed state.

[This invention consists in a novel manner of constructing the rack, whereby a cheap and durable rack is obtained, and one which affords great facilities for cleaning.]

## 49,404.—Flour Chest.—Martin W. Hill, New York City. Antedated Aug. 4, 1865.

I claim, First, The combination of the sliding molding board, I, hinged lid, A, and one or more flour bins, K, substantially as and to the effect herein set forth.

Second, The arrangement hereinabove described of the sliding molding board, I, doors or covers, L, one or more of them, or their equivalent, and one or more spouts or openings, J, for admitting the flour to the bins, as set forth.

Third, The combination of the hinged shelf, E, with the lid, A, substantially as and for the purposes set forth.

Fourth, The combination of one or more flour bins, K, one or more side doors, M, opening thereto, and inner sliding or movable boards for retaining the flour, said inner doors to be so secured as to be each of them capable of ready and complete removal, so as to leave completely open and unobstructed space from the upper remaining board to the top of the opening, which the series of said boards is intended to partially close, substantially as and to the effect above set forth.

## 49,405.—Horse Hay-fork.—N. D. Hinman, Pleasant Dale, Conn.:

I claim, First, Securing or attaching of the teeth or tines to the fork-head, by having the rear ends of the former made in the form of three sides of a quadrangle, to receive the fork-head. The front sides of the quadrangles being fitted in grooves in the front side of the head, and the rear sides provided with eyes, through which and eyes at the rear of the clips, to which the ball is attached, a rod passes, substantially as herein described.

Second, The catch, G, bar, H, and arm, I, all arranged and applied to the handle, B, and in relation with the ball, F, to operate substantially as set forth.

[This invention relates to a new and improved hay-fork for elevating hay in barns by means of a horse, and it consists in a novel construction of the same, whereby the fork is rendered more durable than usual, the head of the fork, not being weakened by the securing of the teeth or tines to it; and the invention further consists in a novel top mechanism for elevating the fork to discharge its load, whereby the trip-rope is made to operate perfectly in any direction, either horizontally or vertically, thereby admitting the fork to be used in the ordinary way, or with a truck on ways in the upper part of the barn.]

## 49,406.—Uterine Supporter.—S. L. Hockett, Pittsburgh, Pa.:

I claim attaching the front ends of the wires, S, S, to the bars, A, by screwing the end of one of the wires into one of the projections, e, at right angles to the line of said bar, so as to act as a hinge, while the end of the other wire is left perfectly plain, and bent so as to pass through a hole in the other projection, e, diagonally to the length of the bar, to form a hook, in the manner substantially as herein shown and set forth.

## 49,407.—Defensive Armor for Vessels of War.—C. O. Holyoke, Boston, Mass.:

I claim the arched metallic beams, F, constructed and applied substantially as set forth, for the purpose specified.

I also claim the arched backing, G, constructed and applied substantially as described, for the purpose set forth.

I also claim the curved cross-laminated facing, H, constructed and applied substantially as set forth, for the purpose described.

I also claim the flat cross-laminated facing, I, constructed and applied substantially as set forth, for the purpose described.

I also claim the tie bars, K, with their projections, a, in combination with the arched beam, F, substantially as described.

## 49,408.—Pump.—Wm. D. Hooker, Stockton, Cal.:

I claim the vertical inclined partition, b, in combination with the suction valve seats, C1, C2, and discharge valve seats, d1, d2, the whole arranged as described and for the purpose specified.

## 49,409.—Magazine Fire-arm.—G. W. Hughes and J. G. Pusey, Providence, R. I.:

First, We claim the magazine, B, having a concave bottom as shown, with the sliding cover, constructed as described, so combined and arranged that the magazine can be filled without detaching any of the parts.

Second, In combination with the magazine, B, the oval spring, C, substantially as described.

Third, The bevel-faced follower, D, in combination with the cap, A, provided with the fingers, F, arranged and operating substantially as and for the purpose set forth.

Fourth, The carrier frame, A, cut away internally, to permit the location of the hammer therein, substantially as shown.

Fifth, The breech block, G, when recessed as shown and described and having a hole for the nose of the hammer to strike through, as set forth.

Sixth, The hammer, H, constructed as shown and located inside of the carrier frame and breech block, as and for the purpose set forth.

Seventh, We claim locating the main spring, K, in the lever guard, O, substantially as shown.

Eighth, The indicator, L, operating substantially as set forth, for the purpose of showing when the gun is cocked.

Ninth, The coiled spring, o', located in the annular recess surrounding the shaft, M, of the retractors as and for the purpose set forth.

Tenth, The stop, N, constructed and operating as herein set forth.

Eleventh, We claim making the under side of the sliding cover of the magazine concave or arched, substantially as shown, to fit it to the form of the bullet.

## 49,410.—Hydro-pneumatic Engine.—John Adam Huss, St. Louis, Mo.:

I claim the compression by hydraulic pressure, acting on the principle of the hydraulic ram, of air into air reservoir, to a sufficient degree of intensity to serve as a motive power.

## 49,411.—Shutter Case.—James Ingraham, New York City:

I claim the stationary frame, a, below the sidewalk or other surface in combination with the sliding shutter case and screw, substantially as and for the purposes specified.

## 49,412.—Hospital Bedstead.—Anthony Iske, Lancaster, Pa.:

I claim, First, A bedstead of two independent sections, A, B, fitting and sliding into each other in the manner and for the purpose specified, in combination with their folding legs, R, U, and head board or frame, A, and removable foot board or frame, Q.

I claim the pillow support formed by the arms, I, braces, L, K, block, P, and bands or webbing, m, all arranged and operating substantially in the manner and for the purpose specified.

## 49,413.—Potato Digger.—James O. Ives, St. Louis, Mo.:

I claim, First, Two rollers, f and s, one above and the other below the axle-tree, r, extending round which is the belt, d, with same kind of teeth as on cylinder, which teeth pass between those on the cylinder at every revolution and carry the potatoes over the upper roller, as shown and set forth.

Second, I also claim a row of teeth on cylinder and on belt, to keep the potatoes from rolling out at either side of the same if necessary.

## 49,414.—Steam Valve.—John Johnson, New York City:

I claim the valve, d, guided in the cylinder, e, and taking a rib-formed seat upon the diaphragm in combination with the screw rod, f, collar, h, and disks, K and T, for the purposes and as specified.

## 49,415.—Shoe.—Joseph L. Joyce, New Haven, Conn.:

I claim the combination of the elastic gore and laciner in the front with the side opening, substantially in the manner and for the purpose specified.

## 49,416.—Scale Borer for Steam Boilers.—Charles H. Keener, U. S. N.:

I claim the combination and arrangement of the bed plate, A, spindle, G, cutter head, H, auxiliary spindle, G2, hand lever, I, clamp, k, and standard, J, substantially upon the principle and in the manner as herein set forth.

[This invention relates to a tool intended to remove the scale from the interior of boiler tubes, and particularly from tubes in what is known as the Martin boiler.]

## 49,417.—Lantern.—Joseph Knitz, West Meriden, Conn.:

I claim the connecting of the two parts, B, E, of the lower part of the lantern together to admit of the turning of the same as described, in connection with the flange, c, and door, F, on the upper end of B, and the opening, d, in E, all being arranged substantially in the manner and for the purpose set forth.

[This invention relates to a new and useful improvement in that class of lanterns which are provided with doors or openings to admit of the wick being lighted, adjusted and trimmed without removing the lamp from the lantern.]

## 49,418.—Deep Well Tube.—Henry R. Koon, Pittsfield, Mass.:

I claim the perforated casing, B, in combination with the shoe, A, and perforated well tube, C, as and for the purpose specified.

## 49,419.—Bracket for Shelves.—Charles F. Kuhnle, Harrisburg, Pa.:

I claim the bracket, B, formed with the projection, b, and flange, b', as and for the purposes herein specified.

## 49,420.—Cartridge Box.—A. D. Laidley, Philadelphia, Pa.:

I claim, First, A cartridge case with recesses in both edges for containing cartridges and provided with two flaps, an i so suspended to the accoutrements that it can be reversed as described for the purpose specified.

Second, The plates, C, hung to the ends of the case and constructed for attachment to the belts, D and E, substantially as described.

## 49,421.—Sewing Machine.—Thomas Lamb and John Allen, Philadelphia, Pa.:

First, We claim alternating the threads which form the seam from one side to the other of the shuttle, so as to remove the twist from shuttle thread, substantially as above described.

Second, We also claim the finger guides, j, j, and the slots, O O1 O2, formed in the slide, C, substantially as and for the purpose above described.

Third, We also claim operating the feeding dog by means of the slide, C, through the action of the slot, h, with its curved outer side and its projecting side, l, and through the action of the elevation, p, the said device being placed on the slide, C, and acting against the under side of the dog, and against its finger, n, substantially as above described.

Fourth, We also claim the combination of the sliding ring of the arm, J, the castor pin, a, and the grooves, t, t, for the purpose of producing the reciprocation of the slide, substantially as above described.

Fifth, We also claim the loop-detaining hook, g, placed on the inside edge of the shuttle, substantially as herein shown.

[This invention in sewing machines consists in several particulars, among which are the inclined position of the race in which the shuttle travels; the peculiar construction and operation of the sliding-piece, which produces not only the necessary reciprocations of the feeding dogs, but also controls and guides the needle thread in making an interlocked stitch with the shuttle thread, and brings the shuttle thread first on one side and next on the other side of the revolving shuttle.]

## 49,422.—Governor Valves.—Charles W. Le Count, Norwalk, Conn.:

I claim the arrangement of the ball and socket joint in the rod of the throttle valve lever of steam engine governors, in the manner substantially as herein described and for the purpose set forth.

## 49,423.—Machine for Raking and Loading Hay.—Miles K. Lewis, John C. Durbin and Lyman P. Lewis, Iowa City, Iowa:

We claim, First, A three-pronged rake tooth, hinged to a vibrating head by two of its prongs, so as to vibrate on the head, and with the third prong working up and down through the head, substantially as described.

Second, And, in combination with the raking teeth, we claim the roller, D, arranged behind the teeth, for the purpose set forth.

Third, We claim the adjustable bar, D2, to support the rake heads, as described.

Fourth, We claim the straps, Q, in combination with the boards, L2, and rails, G G, as described.

## 49,424.—Gas-fitter's Tongs.—Andrew B. Lipsey, New York City:

I claim the clamp or wrench herein described, especially adapted for gas-fitting purposes, the same consisting in the combination of two shafts, constructed, arranged and operating together substantially in the manner specified.

## 49,425.—Machine for Driving Hoops on Casks or Barrels.—J. A. Loomis, Fond du Lac, Wis. Antedated Feb. 15, 1865:

First, I claim the combination of the drivers, D, springs, E, and toothed bar, B Q, when constructed as and for the purposes herein described.

Second, In combination with the above, I further claim the rack, A, on the bar, B, the gearing, e L K, treadle, I, and weight, C, all arranged to operate as described.

Third, The band, P, with the pendants, G, attached, acting on the projecting upper ends of the pivoted drivers, D, when elevated as herein described.

Fourth, The ring, U, in combination with the drivers, D, substantially as and for the purpose set forth.

[This invention relates to a new and improved device for driving hoops on casks, whereby the work may be done in a very rapid and perfect manner.]

## 49,426.—Window.—William Maurer, Buffalo, N. Y.:

I claim the application of spring levers, in combination with sashes which have a swinging and a rising and falling motion, substantially as and for the purpose set forth.

Also, The use of a follower, in combination with the rising and falling sashes, substantially as and for the purpose described.

[This invention relates to a window constructed on what is commonly known as the French plan—that is to say, with two wings which swing on hinges and open and close like a door.]

## 49,427.—Apparatus for Removing Buildings.—John S. McIntire, Chicago, Ill.:

First, The balance, F F', composed of two or more pieces of timbers centrally pivoted to each other, substantially as and for the purposes set forth.

Second, The combination of the balance, F F', and block, C, with the shoes, B.

Third, The arrangement and combination of the balance, F F', block, C, shoes, B, rollers, E, to be used in moving buildings without leveling a track for them, substantially as set forth.

## 49,428.—Folding Desk.—J. F. McNee, Philadelphia, Pa.:

I claim a desk composed of pieces hinged and otherwise connected together and arranged for being folded, substantially as and for the purpose herein set forth.

## 49,429.—Grain Screen.—Charles S. and Joseph B. Messenger, Logansport, Ind. Antedated Aug. 11, 1865:

We claim the cylinder, C, in combination with screen, E, the several parts being constructed, arranged and operated as and for the purpose specified.

## 49,430.—Brick Machine.—Isaac Morley, Allegheny City, Pa.:

First, I claim pressing the clay into the molds by means of steam or other fluid acting on the plates, L, or their equivalents, substantially as shown and described.

Second, The movable molds, E, in combination with the frames, D and G, arranged and operating substantially as and for the purpose herein set forth.

Third, I claim operating the frames, G E and D, by means of the wheels and slides, or their equivalents, as and for the purpose set forth.

Fourth, I claim the arrangement of the frame, D, as shown in Fig. 5, whereby the bricks in the molds shall be moved back from contact with the clay in the hopper or the plates, F, as and for the purpose set forth.

## 49,431.—Steam Generator.—Henry B. Meyer, Cleveland, Ohio:

First, I claim a swinging reservoir suspended within the fire box of a steam generator, and beneath the generating surface of the same, for containing hydro-carbon oils, substantially as shown and described.

Second, I claim a reservoir, B, for containing naphtha or other light oils used for inducing combustion in the oil reservoir, B, above it, in the manner and for the purpose as shown and described.

Third, I claim the combination of the reservoir, B and B, with the deflector, a, placed between them, substantially as shown and described.

Fourth, I claim the combination of the reservoir, B, with the fluid level indicator, D, substantially as shown and described.

Fifth, I claim the deflectors, F, in combination with the reservoir, B, as and for the purpose described.

Sixth, I claim the inverted cup or deflectors, M, placed above the deflectors, F, for the purpose of receiving and distributing the superheated steam, substantially as shown and described.

Seventh, I claim the combination and arrangement of the deflectors, F, and the inverted cups, M, substantially as and for the purpose described and shown.

Eighth, I claim the combination of the super-heating helical pipes, m, with the inverted cups, M, substantially in the manner shown.

Ninth, I claim the circular discs, H" and P, placed in the base of the water chamber, substantially as shown and described.

## 49,432.—Canceling Stamp.—Marcus P. Norton, Troy, N. Y. Antedated Aug. 4, 1865:

I claim the adjustable punch, D, arranged and combined in the manner substantially as and for the purposes herein described and set forth.

I also claim the said punch, in combination with the cork, wood or any elastic substance, E, in the manner substantially as and for the purposes herein described and set forth.

## 49,433.—Foot Warmer.—Alonzo Palmer, Hudson, Mich.:

I claim the arrangement of the corrugated plate, B, with the frame, A, radiator, C, and lamp, E, the several parts being constructed and used in the manner and for the purpose herein specified.

## 49,434.—Bed Bottom.—Samuel Pearson, Cincinnati, Ohio:

I claim securing the joints of bed bottoms by means of a joint-piece constructed and applied to the corners of their frames, substantially as above described.

Second, The combination with the aforesaid joint-pieces of the double-armed springs, E F, and notched pins, c, c, with the slats, C, and frames, D, when said pins and springs are constructed and employed as and for the purposes herein specified.

[This invention consists in an improvement in the supports of the slats of spring bed bottoms, and in their connections with such slats, and also in the mode of jointing or securing the ends of their rails to each other.]

## 49,435.—Band for Bundles.—Charles Perley, New York City. Antedated Aug. 4, 1865:

I claim the band for bundles of bills, paper, etc., formed of a tape with an eyelet, as specified, forming a new article of manufacture.

## 49,436.—Washing Machine.—Mason Pike, North Leverett, Mass.:

First, I claim operating the swinging beaters, D, by means of the pendant plates, G, connected by arms, H, to rock shafts, I, which are actuated by pitmen, K, from reverse cranks, L, on a shaft, M, substantially as and for the purpose set forth.

Second, The water chambers, K R, provided with valves, S, and arranged in relation with the suds box, B, substantially as and for the purpose specified.

[This invention relates to a new and improved clothes-washing machine, and it consists in a novel means employed for operating two swinging beaters, whereby the clothes are operated upon in the most perfect manner, and with but a slight expenditure of power.]

## 49,437.—Truss.—S. S. Ritter, Philadelphia, Pa.:

First, I claim the soft flexible pad or piece, E, made in semi-elliptical or semi-circular form, and employed to receive the pressure of the body immediately around the operating pad, substantially as and for the purpose set forth.

Second, I claim the spring, F, applied directly to the pad, B, in the manner and for the purposes herein described and represented.



#### 49,438.—Apparatus for Preparing Peat.—M. S. Roberts, Lewiston, N. Y.:

I claim, first, the within-described machine for the manufacture of peat, the same consisting of the endless feeding band and its frame, and the box or receptacle for distributing and spreading the peat upon the ground, to be dried, arranged together, and connected with any proper mill for disintegrating the peat, substantially in the manner hereinabove described and represented in the drawings.

Second, The adjustable frame for the endless band, made in separate sections or parts, and connected together substantially as described and for the purpose specified.

Third, Connecting the endless band with, and operating the same by, the driving shaft of the mill, through gearing so arranged as to allow its outer end to be brought to any desired locality, substantially as and for the purposes specified.

Fourth, The arrangement of the distributing or spreading box for the peat, the same consisting in so attaching it to the driving power of the mill as to be freely turned or swung around upon the driving shaft thereof, without disconnecting the same therefrom, substantially as herein described.

Fifth, The use of the spiral feeding shaft for feeding the peat along a its spreader as fast as it enters the same through the tube thereof, connecting it with the disintegrating mill, arranged and operating substantially as described.

Sixth, The device described for marking the peat when spread upon the ground, arranged and connected with its distributor, as set forth.

[This invention relates to improvements in peat machines, with which much of the time, delay and expense now incurred by conveying the peat as it is collected to the mill, and then removing it therefrom, to be spread out for drying, are obviated, the importance and advantages of which are obvious to all conversant with the manufacture of peat fuel.]

#### 49,439.—Driving Wheels of Harvesters.—E. P. Russell, Manlius, N. Y.:

I claim the combination of the driving wheel, A, the pinion, C, and friction roller, B, constructed in the manner and arranged substantially as described.

#### 49,440.—Tree Protector.—Lockwood Sanford, New Haven, Conn.:

I claim the use of a clasp or fastener, composed of two semi-circular parts, as c and c', for the purpose of fastening the joints of troughs for tree protectors, etc., when constructed and fitted for use, substantially as herein described and set forth.

#### 49,441.—Flour Sifter.—Henry W. Sargeant, Jr., Lowell, Mass.:

I claim providing a sieve with a tunnel, substantially as and for the purpose herein described.

#### 49,442.—Sash Supporter.—A. M. Sawyer, Athol, Mass.:

I claim a window-sash stop or supporter, consisting of an elastic roll, containing an unyielding block or center of an irregular form, in cross sections, substantially as described, the said roll revolving in suitable bearings, as set forth.

#### 49,443.—Artificial Leg.—Jacob Schneider, Cincinnati, Ohio:

I claim the arrangement of the sheaths, A and B, and foot, G, the whole being connected together by artificial rods, D, E, F, D', E', F', while elastic straps, H and I, connect to the sheath, B, the heel and the instep of the foot, substantially as set forth.

#### 49,444.—Mode of Ornamenting Show Cards.—F. B. Scott, Buffalo, N. Y.:

First, I claim the combination of a printed or painted card, with yielding of glass, in such a manner that the parts of the letters or their shading, not on the glass, shall be supplied by the colors or shades on the card, substantially as specified.

Second, The exhibition of railroads or other routes by the same method as specified.

#### 49,445.—The Giffard Injector.—William Sellers, Philadelphia, Pa.:

I claim the use of the overflow, d, d', or its equivalent, in the Giffard injector, in combination with a reservoir to retain the overflow water in contact with the jet, for the purpose specified.

#### 49,446.—Sad-iron Fixture.—D. L. Shaw, Lansing, Iowa:

I claim the employment or use, in connection with a sad-iron, A, of a reflector, B, heater, C, and a stool, D, constructed substantially as shown and described, and used either separately or combined, for the purposes set forth.

[This invention relates to certain fixtures for sad-irons, as herein-after fully shown and described, whereby comfort and convenience in ironing clothes are greatly promoted, and the iron kept in a heated state much longer than usual.]

#### 49,447.—Hoop-skirt Joints.—S. J. Sherman, Brooklyn, N. Y.:

I claim a skirt hoop, connected by a link, C, having a guard, D, arranged substantially as and for the purposes herein specified.

#### 49,448.—Apparatus for Carburetting Air.—Warren A. Simonds, Boston, Mass.:

First, I claim operating an oblong and endless belt, with buckets and troughs attached independently and loosely, over a pulley, the diameter of which is largest in the center of its length, and which is made fast to a shaft, said shaft being operated with gears and weights below.

Second, I claim adjusting a long oblong and endless belt, made from leather, meta, or other material, with buckets and troughs attached, so that the lower part, or about one-fourth to one-third of its length, shall be submerged in volatile liquids, such as hydrocarbon, as herein shown.

Third, I claim a reservoir of any desired shape or position, whether perpendicular or horizontal, with a shaft and pulley upon the inside, above the center and near the top of said reservoir, and with a long, endless belt, with buckets or troughs more or less in number attached, d, and operated as above described.

#### 49,449.—Apparatus for Regulating the Pressure and Delivery of Gas.—Warren A. Simonds, Boston, Mass.:

First, I claim, in combination, the double cylinder, B B', the bell, C, and the interior mechanism, or its equivalent, as shown, for the purpose specified.

Second, I claim a double-cylinder reservoir, with two or more openings in and through the bottom or the inlet; others for outlet or outlets within the inside reservoir, in combination with the regulator valve, shown in figure 3, or its equivalent, as set forth.

Third, I claim the construction of a floating reservoir, open at the bottom but tight at the top, with a man-hole at its center for connections from the in and outside, the said reservoir to float in the outside reservoir and between the in and outside cylinders, when used for purposes herein described.

Fourth, I claim connecting to the inlet opening upon the inside a plug or screw valve, with a reversible double pulley, to be operated by a cord, or cords, one end of which is connected upon the inside of the top of the floating holder, while on the end of said cords is a weight sufficient to reverse and open the cock or valve when the holder falls, as specified.

#### 49,450.—Churn.—William H. Slonaker, Cooperstown, Pa.:

I claim arrangement of the notched guides, j, j', in combination with a crank shaft, C, pitman rod, I, h, turn button, l, and churn box, A, with supports, B, substantially in the manner and for the purpose specified.

#### 49,451.—Machine for Tempering Saws, Files, Etc.—John Small, St. Louis, Mo.:

First, I claim the arrangement of the vertical perforated jaws, C C', which are constructed with narrow ribs or elevations upon their surfaces, in combination with the bath tub, A, and the adjusting devices of one of the jaws, substantially in the manner and for the purposes herein described.

Second, The construction, arrangement and operation of the adjustable blocks, g, g', in combination with the jaws, C C', substantially in the manner and for the purposes described.

Third, The arrangement of the adjusting and bracing rods, b, b', with the jaws, C C', blocks, g, g', bath tub, A, and inner support, A', substantially in the manner and for the purposes described.

#### 49,452.—Hand Stamp.—Samuel J. Smith, New York City:

First, I claim a movable bed, or section of the bed, in combination with a hand stamp, substantially as specified, whereby the impression can be made against the movable portion of the bed, or against a book, or other article, when the bed is removed, as set forth.

Second, I claim a ribbon holder, a carrier attached to, and adjustable on, the sliding rod, that carries or forms the stamp, substantially as and for the purposes specified.

#### 49,453.—Tree Protector.—James C. Starbuck, Cambridge, Mass.:

I claim the tree protector as made of a fluid-containing trough, placed upon a tubular stand, surrounding the trunk and supported from the ground, substantially as and for the purpose specified.

#### 49,454.—Apparatus for Making Paper Bags.—Byron B. Taggart, Watertown, N. Y.:

First, I claim the method herein described of making paper bags or sacks.

Second, In the manufacture of paper bags, substantially as herein described, I claim the use of the apparatus or implement, when constructed and arranged for operation, as hereinafter set forth.

Third, As a new article of manufacture, I claim a paper bag or sack, made in the manner and by the means hereinbefore set forth.

#### 49,455.—Hay Rack for Wagons.—William M. Thomas, Binghamton, N. Y.:

I claim a rack for hay and grain having its several parts secured together in the manner substantially as shown and described, to admit of said parts being fitted together and taken apart and adjusted to the wagon and taken therefrom with the greatest facility, and also of being stowed away in compact form when not required for use.

[This invention relates to a new and improved hay and grain rack for wagons and carts, and it consists in constructing the rack in such a manner that it may be applied to and removed from a wagon or cart with the greatest facility by a single individual, and placed or stowed away in a very small space, when not required for use.]

#### 49,456.—Shank Cutting Machine.—S. D. Tripp, Lynn, Mass.:

I claim the grooved and toothed or corrugated rollers, G, G, in combination with the adjustable knife or cutter, D, having a zig-zag cutting edge, all arranged to operate substantially in the manner as and for the purpose set forth.

[This invention relates to a new and improved machine for cutting shank-pieces for boots and shoes, while pieces are placed between the inner and outer soles to give a roundness to the latter and strengthen the shank.]

#### 49,457.—Brush.—Abram Van Dusen, Chicago, Ill.:

I claim a brush made by the employment of whalebone, haircloth and combined with any suitable material having a flange or knob as above described.

#### 49,458.—Device for Cleaning Lamp Chimneys, Bottles, Etc.—James T. Walker, Palmyra, N. Y.:

I claim an instrument for cleaning lamp chimneys, bottles, etc., constructed substantially as herein shown and described.

[This invention provides a cheap and efficient instrument or device for cleaning out chimneys, decanters, bottles, etc.]

#### 49,459.—Machine for Cutting Harness Leather.—John Wehr, Roanoke, Ind.:

I claim the yielding guides, c, and the adjustable bits or covers, b, in combination with the pressure roller, E, all arranged to operate substantially in the manner as and for the purpose herein set forth.

[This invention consists in a series of bits, placed in an adjustable frame, and a series of guides placed in a yielding frame, the above parts being used in connection with a pressure roller, and all arranged in such a manner as to admit of leather being cut in rounded form, to serve as filling for rounded or raised straps for harness.]

#### 49,460.—Seeding Machine.—Benj. Wieland, Orangeville, Ill.:

I claim the combination of the plow beam, B, the hopper, E, and inclined vibrating seed-receptacle, P, when the parts are arranged with relation to each other, and provided with the accessory appendances herein described and represented.

[This invention relates to a new and improved seeding machine for sowing seed broadcast, and to be attached to any plow, so that the operation of plowing and sowing the seed may be simultaneously performed, and a great economy effected in labor.]

#### 49,461.—Steam Pump.—Martin Wilcox, Sacramento, Cal.:

First, I claim the condenser, C, in combination with the receivers, R, for exhausting the receiver, and discharging uncondensed steam, constructed and operating substantially as set forth.

Second, I claim the combination and arrangement of the cylinder and its piston for working the steam gate, g, in the manner substantially as described.

Third, I claim the combination of the pendulum, h, for regulating the motion of the gate, g, in the manner and substantially as described.

#### 49,462.—Valve Gear for Steam Hammer.—C. W. Willard, Chicago, Ill.:

I claim the T-shaped lever, E, and adjustable dogs, e, in combination with the steam valve cylinder and hammer, all constructed and operating substantially in the manner and for the purpose set forth.

[This invention consists in the employment or use of a T-shaped lever, which connects with a crank on the valve stem, and which carries two adjustable dogs, in combination with a tappet attached to the crosshead of the steam engine, which imparts motion to a hammer, in such a manner that by this action of the tappet on the dogs the steam is changed at the desired points, and by adjusting said dogs on the shanks of the T-shaped lever the stroke of the hammer can be regulated.]

#### 49,463.—Breech-loading Fire-arm.—W. T. Wilson and Henry Flather, Bridesburg, Pa.:

First, We claim the hinged breech-piece, E, having a movable axis of vibration in being opened and closed, in combination with the piston, C, which moves in line with the bore, operates against the base of the cartridge, and is locked by said breech-piece, substantially as described.

Second, In combination with the piston, C, having projections, c, for guiding it, by sliding in grooves, as described, we claim the link, e', caused to advance and retract the piston in line with the barrel during the opening and closing movements of the breech-piece, E, and entering the grooves, f, when the breech-piece is closed, for the purpose explained.

Third, We claim the exploding pin, G, having a knob or finger piece, G', when used for locking the breech-piece, as set forth.

#### 49,464.—Churn.—B. L. Winner, Belvidere, Ill.:

I claim the combination of the oblique stops, K, with hinged dashers, I, and bars, H, all constructed, arranged and operating as specified.

[This invention relates to a new and improved churn, of that class in which two reciprocating dashers are employed, and it consists in having the dashers attached to their rods by a joint or hinge, and having stops attached to the rods, all being arranged in such a manner that the dashers when ascending, or being forced down through the cream, will be kept in a longitudinal position, so as to act efficiently upon the cream, and, when ascending, allowed to bend down, so as to offer but little resistance to the cream, and thereby admitting of the churn being operated with but a moderate expenditure of power.]

#### 49,465.—Swing.—F. R. Wolfinger, Vermont, Ill.:

I claim an automatic domestic swing for infants, constructed

and arranged substantially as above described, so that the seat and back move in correspondence with each other.

[The object of this invention is to produce a swing for infants to take the place of a cradle. Its motion is forward and backward, in each of its lateral directions, as in the motions of the cradle. The back and the foot-board are hinged, so that they can be raised and lowered, and they are, moreover, connected to cords, which cause their motions to be communicated to each other.]

#### 49,466.—Eave-trough Bracket.—William Yapp, Cleveland, Ohio:

I claim the bracket, A, arranged with a socket, A', to receive the pin, B, lip, b, and metallic fastener, F, substantially as and for the purpose set forth.

#### 49,467.—Paint.—Edwin Battley (assignor to himself and James Crane), Mont Clair, N. J.:

I claim the use of creosote as a vehicle for paint.

[This invention consists in the use of creosote or carbolic acid as a vehicle for paint.]

#### 49,468.—Padlock.—Henry D. Blake (assignor to Pand F. Corbin), New Britain, Conn.:

I claim dividing a padlock and its link into two parts or sections, hinged at one end and held and locked together by means of the spring hook, f, or its equivalent, arranged and operating substantially in the manner described.

[This invention consists in transversely dividing the casing of a padlock, having its links at both of its ends permanently attached thereto and its link, at or near the center of the same, into two parts or more sections hinged together at their lower ends, upon the interior of which casing, and extending across it, a suitable holding hook is so hung and arranged that when the two parts composing the padlock are brought together they will be locked in such a manner as only to be opened with a proper-shaped key.]

#### 49,469.—Gas Stove.—Elijah J. Caldwell (assignor to himself and Alex. M. Lesley), New York City:

I claim the arrangement and combination with the cylinder, A, of the tube or cylinder, F, sieve, G, and perforated flanged top, H, constructed and operating together substantially as and for the purposes specified.

#### 49,470.—Grain Dryer.—Lewis S. Chichester (assignor to himself and C. W. Mills), Brooklyn, N. Y. Antedated Aug. 11, 1865:

First, I claim a series of tables, inclined in alternate opposite directions, and placed together, in a zig-zag form, as specified, so as to leave a space above the grain between one table and the next, for the passage of air, as set forth.

Second, I claim a stationary support or bar placed across and above an inclined table to support the grain and cause it to form a layer of nearly uniform thickness, substantially as specified.

Third, I claim the regulating dampers at the ends of the air spaces between the tables, in combination with a series of tables set together in a zig-zag form, as specified.

Fourth, I claim the hopper formed with partitions standing at an inclination to each other, in combination with an inclined table for grain, as specified, whereby the grain is taken away from the lower edge of the said inclined table with uniformity, as set forth.

Fifth, I claim an inclined table to contain a layer of grain to be dried, and provided with a narrow space above and below said table through which a current of heated air is passed, as and for the purposes specified.

#### 49,471.—Sheet-metal Spoon.—James Fallows (assignor to Porter & Booth), Philadelphia, Pa.:

I claim a sheet-metal spoon constructed of two pieces of sheet metal, substantially as described and set forth, as an improved article of manufacture.

#### 49,472.—Let-off for Looms.—Horatio Fiske (assignor to himself and Alfred Morse), Farnumville, Mass.:

I claim the combination of the positive motion or mechanism for effecting the regular intermittent rotary motion of the cloth beam, such consisting of the shaft, E, machinery for rotating in manner as described the screw, L, the worm gear, M, the shaft, N, the pinion, O, and the gear, P, or their mechanical equivalents, and the mechanism by which the yarn beam is caused to deliver warp and to remain at rest under circumstances, as set forth, such being the clutch wheels, d, e, the shaft, S, the worm, T, the slider, g, its retracting spring and standard, or their equivalents, the gear, U, the shaft, V, the pinion, X, and the gear, Y.

I also claim the combination of the nut, l, and the screw, m, or their mechanical equivalent, or equivalents, with the said positive motion or mechanism of the cloth beam, and with the said mechanism by which the yarn beam is caused to deliver warp and to remain at rest under circumstances, as set forth.

I also claim the combination of the stationary tubular shaft, F, with the aforesaid positive motion or mechanism of the cloth beam, and with the said mechanism by which the yarn beam is caused to deliver warp and remain at rest under circumstances, as set forth.

I also claim, in connection with the said positive motion or mechanism of the cloth beam, and with the aforesaid mechanism by which the yarn beam is caused to deliver warp and remain at rest under circumstances, as specified, the application of each or either of the worm gears to its shaft, in such manner as to enable such worm gear not only to maintain its connection with the shaft, so as to be revolved by it, but also to be moved on its shaft relatively to its screw, in manner and for the purpose of disengaging the said worm gear and screw, as specified.

I also claim the combination consisting of the clutch wheels, d, e, the shaft, S, the worm, T, the slider, g, its retracting spring, k, and standard, i, the gear, U, the shaft, V, the pinion, X, and the gear, Y, or their equivalents, the whole being applied to the cloth beam, and operated by means and for the purpose substantially as above specified.

#### 49,473.—Bung for Casks.—Michael Hickey, Boston, Mass., assignor to himself, Edwin H. Maxwell, Boston, Mass., and John T. McKnight, New York City:

I claim a metal bung, with its ring, a, and its hoop, H, formed, fitted and secured to the stave, substantially in the manner and form, and for the purposes set forth in this specification.

#### 49,474.—Torpedo.—Henry Holden (assignor to himself and John E. Stow), New York City:

I claim a torpedo made of a sheet of absorbent material, saturated wholly or partially with a solution of fulminate of silver or of mercury, substantially as and for the purpose set forth.

[This invention consists in a torpedo made of a plain sheet of paper, or other absorbent material, which is wholly or partially saturated with a solution of fulminate of silver or of mercury, in such a manner that, after drying, the fibres or pores of the paper or other absorbent material are filled with fulminate, and a slight blow or pressure with a hard substance causes the same to explode with considerable noise.]

#### 49,475.—Wharf, Pier and Warehouse.—J. B. Hyde, Newark, N. J., assignor to the New York Pier and Warehouse Company, New York City:

I claim a combined wharf, pier and iron base, substantially as described.

#### 49,476.—Spring for Upholstering Purposes.—William H. Mallory, Bridgeport, Conn., assignor to himself, Nelson H. Downs and Robert N. Bassett, Derby, Conn.:

I claim a spring for upholstering and other purposes, constructed substantially as herein set forth.

#### 49,477.—Miner's Lamp.—William McClave, Hyde Park, Pa., assignor to William P. Connell and William M. Silkman, Scranton, Pa.:

I claim a miner's lamp, made substantially as herein shown and described.

[This invention consists of a peculiarity in the form of the lamp by which its stability when attached to the hat of the miner is increased, and the loss of oil occasioned by the swaying, tipping and unsteadiness of the lamp is prevented.]



49,478.—Straw Cutter.—John McMahon (assignor to himself and Abner Cory), Hamilton, Ohio:

I claim, First, The arrangement of the knife, G, with its double edge, in combination with the crank wheels, H, H, and slotted face-plate, P, to operate in the manner described, for the purpose specified.

Second, I claim the combination of the feeding mechanism with the knife and crank wheels, whereby the feeding and severing of the material is effected alternately, and both at each half revolution of the shaft, F, substantially as described.

49,479.—Let-off for Looms.—William W. Pomeroy (assignor to himself and J. W. Wilson), East Hampton, Mass.:

I claim the conical socket or seat in the end of the warp beam, in combination with the sliding friction plug, elbow lever and weight suspended from the bight in the warp, substantially in the manner and for the purpose set forth.

49,480.—Manufacture of Paper Pulp.—Julius Augustus Roth, Philadelphia, Pa., assignor to James B. Brown, Peekskill, N. Y.:

I claim treating fibrous materials such as herein specified, after the same have been reduced into small particles, with chlorine gas in a dry state, and under continuous agitation, produced by means substantially as above described, or any other equivalent means, for the purposes set forth.

49,481.—Lock.—Henry B. Tyler (assignor to himself and Eugene M. Prevost), Norwich, Conn.:

I claim constructing the latch, B, of a door lock in two parts, C and D, as described, which can be united or disconnected at pleasure, to serve the purposes of a latch or of a bolt, as desired, and operated in the manner and on the principle as herein specified.

I also claim the combination of the cam wheel or tumbler, G, with the connecting links or levers, substantially as described, for the purposes specified.

49,482.—Insulator for Telegraph Wires.—Henry H. Ward, New York City, assignor to S. F. Van Choate and Stuart Gwynne:

I claim, First, An insulator for telegraph wires, etc., provided with a dead air-chamber, D, substantially as and for the purpose set forth.

Second, The combination of the plug, A, cup, C, and hook, B, constructed and operating substantially as and for the purpose described.

49,483.—Musical Instrument.—George Woods, Cambridge, Mass., assignor to Mason & Hamlin, Boston, Mass.:

I claim, First, In cabinet organs and other wind instruments, making the valve adjustable by supporting it or holding it to its valve seat, or to the surface of the reed board, by means of a hinged carrier extending the length of the valve, and parallel, or nearly parallel therewith, substantially as described.

Second, I also claim securing the valve against the face of the carrier piece, E, so as to prevent lateral displacement by means of a pin, I, substantially as described.

Third, I also claim so constructing and applying the valves in cabinet organs and other wind instruments, when they are supported by an outer piece, as here shown, that they can be removed by simply laying aside the spring which holds them up to their seats, and lifting the outer pieces, E, or lifting the valve from such pieces, substantially as described.

49,484.—Bolt Machine.—Abram Alexander, Pittsburgh, Pa.:

I claim the use of sector dies, operated and arranged substantially as described, for rounding the shank of the bolt previous to the heading.

The combination of the sector dies or swages, C, swage frame, A, sliding frame, G, G', for the purpose of rounding the shank of the bolt and leaving that part which is to form the head square, substantially as hereinafter described.

The combination of the drop hammer, gripping dies and detached heading tool, constructed and arranged as substantially described, for the purpose of heading bolts, while the iron is hot, by a single stroke.

Delivering the finished bolt from the dies by means of the stroke of a hammer acting in the manner substantially as hereinafter described, on the end of the bolt.

The use of the adjustable stop to support the end of the bolt blank in the dies, and regulate the depth of the round cavity of the dies to suit the required length of the shank of the bolt.

The combination of dies, K, L, the clamp, J, J', the drop, P', the heading tool, T, and hammers, H, constructed, arranged and operated substantially as described, for heading bolts.

49,485.—Wind Wheel.—Henry Oceanus Cook, London, England:

I claim a wind wheel composed of wrings or sails, B, curved so as to form a portion of a circle, or a section of a scroll, in their horizontal section, and of taper form, longitudinally, as described.

I further claim a space or opening between the edges of the wrings or sails, when the latter are of the shape or form specified, for the purpose set forth.

[This invention relates to a new and improved wind wheel, applicable for all purposes] in which it is designed to obtain power from the wind for driving machinery.]

49,486.—Spirit Meter.—John Hutchings Cox, John Murphy and William Murphy, Montreal, C. W.:

First, We claim the combination with the revolving drum and pans of suitable tappets, acting on a weighted lever, and ratchets, O, O', with detents, G, G', all working together in the manner and for the purpose substantially as described.

Second, The sample cup, F, and sample receivers, h, h, in combination with the revolving drum and pans, constructed and operating substantially as and for the purpose set forth.

Third, The cistern, E, applied in combination with the revolving drum, sample cup, sample receiver and registering mechanism, constructed and operating substantially as and for the purpose specified.

Fourth, The siphon tube, A, with stop valve, B, and tilting tube, C, or its equivalent, in combination with the float, O', and chamber, B, constructed and operating substantially as and for the purpose described.

[This invention relates to an apparatus intended for the purpose of measuring alcoholic liquors, and particularly to control the quantity of liquor sold by distillers, manufacturers or dealers, with the special view to enable tax collectors to get at true results without trouble or danger of being cheated.]

49,487.—Manufacture of Steel, Etc.—Robert Mushet, Cheltenham, Eng.:

I claim melting material or mixtures of materials which when melted produce cast steel, cast semi-steel, or cast homogeneous iron, together with carbonaceous matter, and simple or compound ores of titanium, oxides of titanium, or titanate acid or other titanium compounds, or those substances deoxidized or partially deoxidized, in order to improve the quality of the said cast steel, cast semi-steel, or homogeneous iron produced.

49,488.—Photographic Process.—Jacques Wothly, Paris, France, assignor to Joachim Goulart da Silveira, United States. Patented in England Sept. 12, 1864:

I claim the process above described for obtaining photographic proofs by means of photogenic substances, the preparation of which I have described, said photographic proofs being obtained, as aforesaid, without the assistance of iodide, chloride, bromide of silver, and without development.

[This invention consists in substituting in the photographic process for the iodides, chlorides or bromides of silver, a colloid containing uranium, or a uranium colloid, so that by the reductive properties of the uranium in the light direct and distinct proofs are obtained by exposure to the light under the negative, and thereby the operation of developing the picture is saved, nothing more being required after the printing but to fix the picture in any suitable manner.]

## REISSUES.

2,051.—Washing Machine.—John S. Lash, Philadelphia, Pa. Patented Oct. 14, 1862:

I claim the combination with the wash-box and its rolls or rubbing

surface a reciprocating washboard, connected by elastic or yielding arms, d, to a cross bar, e, that moves and is guided in grooves, f, in the side of the washbox, as and for the purpose herein described and represented.

2,052.—Wringing Machine.—John S. Lash, Philadelphia, Pa. Patented Oct. 14, 1862:

I claim, in combination with a permanent frame, carrying one roller, a vertically moving gate, carrying another roller; the journals of said rollers mutually passing through slots in the frame and gate, to keep them in proper working position, and said gate being moved and held down to keep its roller in close-working contact with the frame roller, by means of a lever and pitman, as herein described and represented.

2,053.—Lathe Chuck.—William A. Reilly, Cincinnati, Ohio. Patented May 30, 1865:

I claim the combination with the face plate of a lathe chuck of the mandrel, E, the arm, I, and adjustable slide, H, arranged substantially as and for the purpose described.

Second, The above-described lathe chuck, provided with the adjustable slide, H, carrying the arm, I, and adjustable slide, K, substantially as and for the purpose set forth.

## DESIGN.

2,163.—Sign.—Ezechel Berg, New York City.



## 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-HALF 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 eighteen 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 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.

[See Judge Holt's letter on another page.]

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.

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The Patent Laws, enacted by Congress on the 2d of March, 1871 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.

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Persons desiring to file a caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. The Government fee for a caveat is \$10. A pamphlet of advice regarding applications for patents and caveats is furnished gratis, on application by mail. Address MUNN & CO., No. 37 Park Row, New York.

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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.

## HOW TO MAKE AN APPLICATION FOR A PATENT.

Every applicant for a patent must furnish a model of his invention 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 out little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park Row, New York.

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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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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

## EXTENSION OF PATENTS.

Many valuable patents are annually expiring which might really 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 of 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.

Communications and remittances by mail, and models by express (prepaid) should be addressed to MUNN & CO., No. 37 Park Row, New York.



F. S., of Ill.—The expansive force of heat when acting through the medium of iron or other metal, may be regarded as practically irresistible. It has been said that iron, under the action of heat, expands with a force equal to its power of resisting a crushing pressure. Gases, however, under the action of heat expand with a force which can be restrained, and which has been accurately measured.

A. L. S., of Mich.—Oil of cloves is added to mucilage and other organic substances to prevent molding or souring.

L. T. C., of Ohio.—"Smee's Electro-metallurgy" was republished by John Wiley, of this city.

W. P. N., of Mo.—The idea that the sun is invisible from high altitudes is absurd.

W. H., of Ill.—Your notions about the difficulty of squaring the circle are correct, but it is also true that the problem would be solved by the discovery of the exact proportion between the radius and circumference.

G. P., of Mass.—It is a disgraceful fact, but the statistics collected by the census of 1860 are not yet published.

R. H., of Mass.—The day changes off the east coast of Asia. Monday in China is Sunday in the islands a few miles to the eastward.

G. W. C.—The person who exercises the mental effort termed invention is the inventor; not the mechanic who simply carries out the new idea.

Madison, Ind.—Rotating steam valves are not new, but yours may contain novel features. You had better send us a sketch and description of the plan for examination.

D. G. A., of Md.—You can procure a good turbine water wheel of Talbot & Underhill, No. 170 Broadway.

L. H. C., of Ind.—The *Druggists' Circular* is published at No. 26 Hickman street.

H. L., of Pa.—For a list of recent valuable patents we refer you to the columns of this journal. We cannot undertake to prepare a list, with description, of those we deem most valuable.

N. J. A., of N. Y.—We do not remember ever to have seen a machine for cutting green corn from the cob for succotash.

S. F., of Ill.—Traps for catching roaches have been made, but we never yet saw one that was worth buying. Poisons are sold by druggists which are good exterminators of this household pest.

O. O., of N. J.—We have had more discussion about perpetual motion than is profitable, and we do not care to repeat it just now. We must refer you to back numbers.

C. F. B., of Mass.—It would not pay for you to get up a portable engine to go about the country sawing wood and for threshing, since you can buy them much cheaper of parties who make them for sale. There are no objections to oscillating engines, properly made, for such uses.

T. H. W., of Conn.—You can bore a hole with a drill in a lathe as "true as a die," if you only start the drill in true. It is easier and quicker to bore a small hole true with a drill than to bother with a boring tool. In case the drill is used it must be flat, and the work must be cast solid.



W. A. R., of Mass.—There is no danger in connecting boilers with a globe valve between them. It is only when a boiler without a safety valve is dependent on another boiler with a safety valve, from which it may be shut off by the globe valve, that danger is to be apprehended.

L. M. B., of Ohio.—Good draughtsmen are always in request in this city. If you desire to secure a place for your friend do not "inclose a very moderate specimen of his abilities," but show the best sample you have.

A. B. W., of La.—We think that several machines have been illustrated in the SCIENTIFIC AMERICAN which would do all that you say of the machine you refer to.

C. A. W., of Mass.—Lindsay & Blakiston, of Philadelphia, published, in 1888, a small work by Overman on Practical Mineralogy, Assaying and Mining. The ores of antimony are described in Dana's Mineralogy.

J. B. B., of N. Y.—For full direction for making hard soap see Ure's Dictionary; also, back numbers of the SCIENTIFIC AMERICAN. We sometimes, at the request of subscribers, publish articles two or three times, but we have published this time enough.

A. C. T.—There is no such paper published.

P. H. W., of N. Y.—Communications to the American Institute may be addressed to John Chambers. The State Fair will probably be advertised.

W. D. S., of N. Y.—Your experiments with copper cartridges were admirably made and reported, but the question seems to be settled. If the cartridges are properly made there is no trouble about the temperature. H. L., the same.

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PHOTOGRAPHS OF FORTY DIFFERENT BREECH-loading Muskets, recently tested by order of the Secretary of War, at Springfield, Army. Send for descriptive circular to the publishers. MILTON BRADLEY & CO., Springfield, Mass. 9 3\*

BUSINESS.—A RELIABLE MACHINIST, ENGAGED in business in some smart town (New England preferred), near good schools and churches, who could extend it by associating with a practical man, with some capital, can bear of an opportunity by writing to C. B. SUMNER, Whitinsville, Mass., giving name, business and location. None others will be noticed. 9 2\*

BEING DESIROUS OF PURCHASING PORTABLE Saw-mills for the Southern trade it is requested that manufacturers will send circulars to the following address, H. A. B., Box 552, Hartford, Conn. 1\*

FOR SALE—THE RIGHT FOR NEW ENGLAND OF Smith's Artificial Leg. Illustrated in SCIENTIFIC AMERICAN, Oct. 24, 1863. Address URIAH SMITH, Battle Creek, Mich. 1\*

TO GAS, WATER AND STEAM PIPE FITTERS.—The undersigned would respectfully call the attention of all in the above line of business to their large assortment of Tools, viz.: Screwing Machines for Hand and Power; Peace's Patent Pipe Clamp and Patent Combined Screwing and Cutting-off Stock. Also all other Tools used in the trade. Manufactured and for sale by CAMDEN TUBE WORKS, Camden, N. J., Or, SEYFERT, McMANUS, & CO., No. 25 South Seventh street, Phila. 8 4\*

BRICK! BRICK! BRICK!—THE BEST AND MOST Improved Power-press Brick Machines, worked by either horse or steam power, and now making nine-tenths of all the brick used in the City of New York and its surroundings, can be had by applying to K. A. VERVALEN & CO., Haverstraw, Rockland Co., N. Y. 8 16\*

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TO MACHINISTS AND MACHINE MANUFACTURERS.—Chas. R. Long's Patent Improved Gem or Cog Wheel, calculating rules 24 inches long correctly graduated, giving the number of cogs in figures directly opposite their diameters, for 2,000 different gears. Price \$3 U. S. currency, sent free. Send stamps for illustrated circular. Address CHAS. R. LONG, Worcester, Mass. 9 12\*

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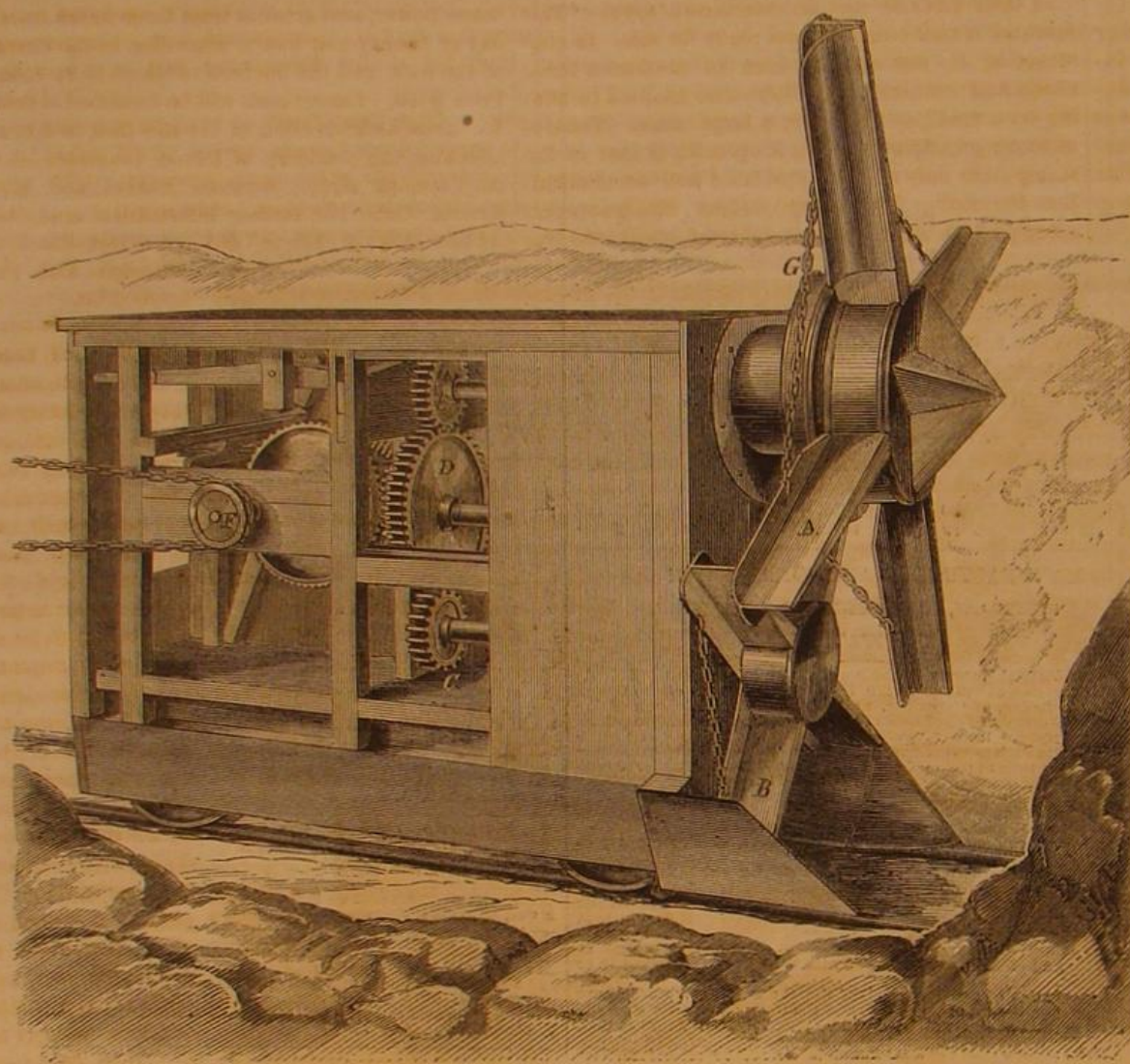
**Improved Snow Plow.**

This engraving represents a new snow plow which is intended to clear railway tracks, where the common plow cannot be used, and to excavate great drifts that block up "cuts" and wholly impede the progress of the engine unless shoveled away. In detail this snow excavator consists of two sets of rotating wings or scrapers, A and B, termed "shovels" by the inventor, which are operated by the gears, C, D and E. These gears are driven by the belt or chain passing over the wheel, F, said chain being operated from the locomotive. These rotary wings move in opposite directions, and, as may be seen, they bore the snow away when brought in contact with the

**Human Fallibility.**

History is full of instances where the fallibility of man has proven the destruction of some great enterprise. The latest recorded is that of the Atlantic Cable, whereon millions of dollars have been spent, and high reputations jeopardized, by its failure. It is stated by the *Financial Chronicle*:—

"When the first cable was made, it was discovered, at the last moment, that one-half of it, manufactured at one place, was twisted the opposite way from the other, manufactured at another. Was this a blunder of the directors, or was it designed on the part of an enemy, whom they could not discover? Again, the defect which finally caused the first cable to be aban-

**BALL'S SNOW PLOW.**

drift. Suitable means are provided for throwing the upper scraper out of gear with the driving wheel, D, so that the lower one is alone used if required.

By a further arrangement, not shown, the scrapers of the upper wheel are jointed at the bottom, and so fixed that they can be lowered horizontally, so that they all point forward, as the legs of a high stool would if held horizontally. They are thus enabled to make, at first, a small opening in the snow, and widen it gradually. As the upper scrapers remove the snow it falls down upon the track, and it is the office of the lower scrapers, together with the brooms, to throw it on one side, so that the rails will be kept clean. This machinery is all contained in the car shown, which is pushed ahead of a locomotive as usual. The chains, G, are intended to stay the wings against the strain imposed upon them, and they can be reversed so as to act in any direction.

A patent is now pending on this device through the Scientific American Patent Agency. For further information address the inventor, Willard A. Ball, at Laporte, Ind.

A CASE of spontaneous combustion has just occurred on board the Hamburg schooner *Ingleborg*, Captain Peter Blohm, which loaded a cargo of coals at Hartlepool, and sailed thence on Saturday last for Hamburg. All went on well till they reached the Dogger Bank on Sunday last, when suddenly an explosion took place, blowing the ship's deck high up into the air. The captain was the only one injured, his face, eyes and hands being much burnt; the rest of the crew escaped unhurt. They had just time enough to get into the stern boat and leave the ship when she went down.

done was known to exist when only a few hundred miles of the wire was submerged. Was this defect, and the neglect to remedy it while there was yet time, all accidental, or were they both but parts of one hostile design, committed by employees or strangers? Finally, after every possible care had been taken, no sooner had the *Great Eastern* started on her present voyage, than a defect was discovered in the cable, caused by the pressure of a piece of stout wire, which was driven quite through the outer wires and gutta-percha coating, so as to touch the inner wire, and thus allow the electric current to escape to the earth."

**A Novelty in Railroad Refreshments.**

A gentleman traveling on the continent sends to the *London Times* a note regarding a plan adopted at Vesoul, a railway station in France, which he recommends to the restaurants in British stations, and which might perhaps be copied with advantage in this country. No trains stop long at Vesoul, but "MM. the travelers" are informed by plentiful advertisements that if they wish either to breakfast or dine they will find hot meals in baskets at the buffet. The meals are composed of three dishes, half a bottle of wine, bread and dessert. The passengers leave the empty basket and dishes half an hour later at the next station, and pay two francs fifty centimes, or about fifty cents in American currency, for their leisurely and comfortable repast.

**NEW COMMISSIONER OF PATENTS.**—We are gratified to announce that Hon. Thomas C. Theaker, of Ohio, has been appointed Commissioner of Patents to succeed Hon. D. P. Holloway, resigned.

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## Improved Quartz Mill.

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

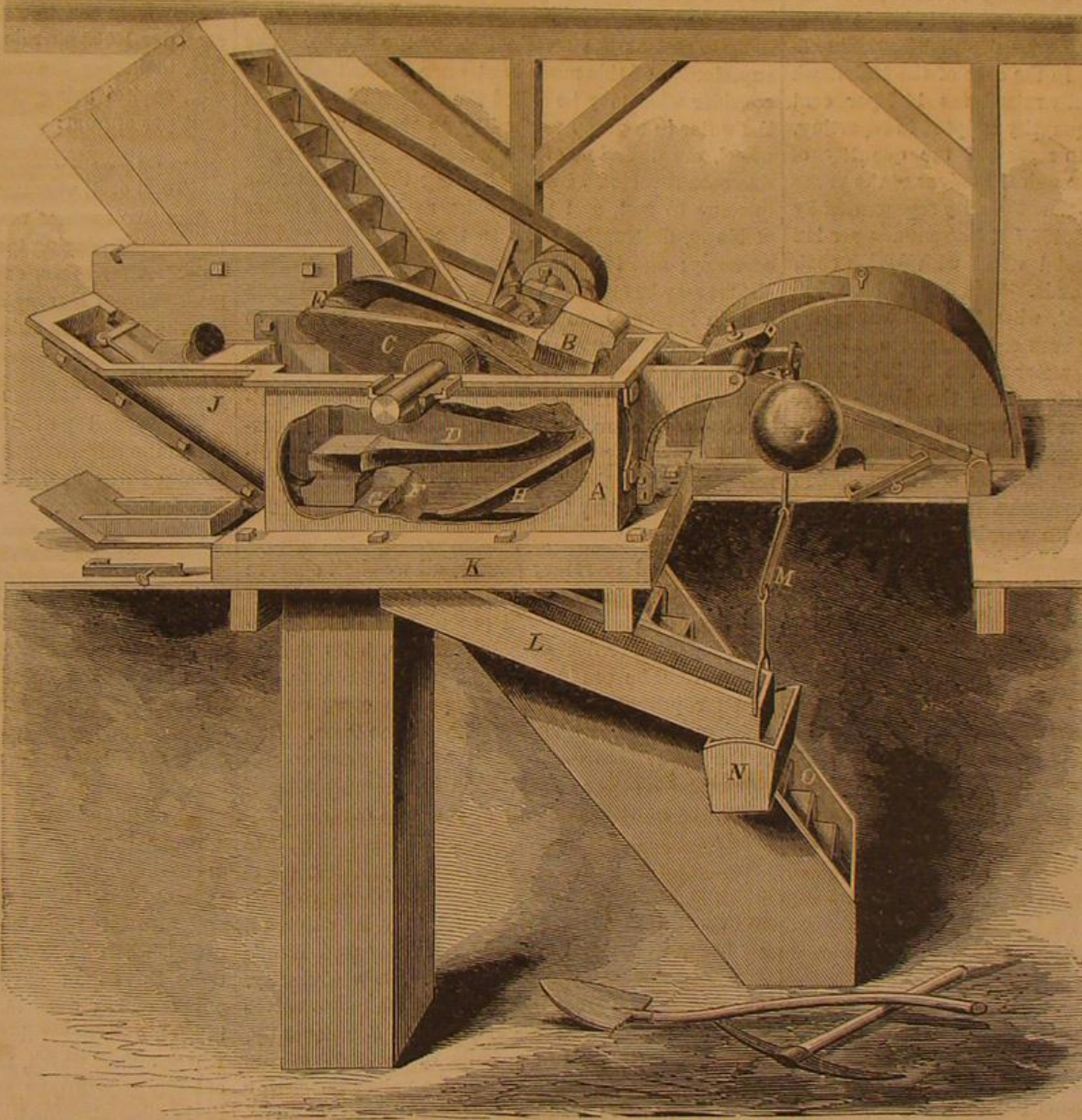
The engraving published herewith represents a quartz mill which is entirely original in design and conception. The crushers consist of hammers struck upon an anvil in a manner similar to that performed by hand, and the blow thus given is claimed to be effective both in its percussive force and the subsequent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

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

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

In their circular the manufacturers say:—"This machine is now complete and ready for sale. In constructing it, our aim has been to produce a light, cheap and economical crusher—one adapted to mining on a small as well as on a large scale. The elementary principle on which it operates is that of the stamp—the only one really reliable and economical. But the stamp has many serious disadvantages, among which are its great weight and small velocity;

horse power, and crushes from three to ten tons per day of twenty-four hours, according to the character of the rock and the fineness to which it is reduced. Price \$800. Larger ones will be furnished if desired. We invite an inspection of the mill now in operation adjoining the foundry of Devoe, Dinmore & Co., on Fremont street, between Market and Mission streets, Cal. For further information apply to or address Rix & Logan, No. 11 Court Block, San Francisco, Cal. Patent applied for.



RIX & LOGAN'S HAMMER QUARTZ MILL.

the great power required to run it; difficulty in feeding properly; imperfect discharge, and the necessity of crushing wet, or the annoyance from dust in crushing dry. All these difficulties are obviated in our machine, and the percussive blow of the stamp retained, with the further advantage of its being a drawing or grinding one. We give to our hammers such absolute or relative weight and velocity as we choose, just such as to effect their purpose and no more, thus securing the qualities of the natural hammer blow. The feed is self-adjusting and uniform, and as fast as the ore reaches the required degree of fineness (which depends upon the fineness of the screen or sieve used) it is instantly discharged, so that there is no packing of the ore under the hammers. The mill crushes dry, with no more dust than that incident to feeding, which is trifling. As the only support of the mortar is a single post set into the ground, the machine can be put in place at slight expense. The size now being built weighs about 1,800 pounds, complete; the heaviest piece not weighing over 275 pounds. It is driven by half-a-

pressing cloths and stuffs) is older than the wash-woman's, being due, it appears, to one Nicias, the son of Hermias. His grand discovery would be the employment of an earth, since named after the persons who used it. The Roman fullers, who washed dirty togas, were persons of no little importance. Their trade, and the manner of carrying it on, were regulated by laws such as the *Lex Metalla de fullo-nibus*.

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

## Origin of Soap.

The application of soap as a detergent is not of high antiquity. Like other usual things, electric communication for instance, it seems to have been known, as a fact, for a considerable time before it was turned to its most serviceable account. At first soap was merely a cosmetic for smoothing the hair and brightening the complexion. When once its valuable detergents powers were discovered—doubtless by accident—its employment spread rapidly. Numerous soap manufactories sprang up in Italy, notable in the little seaport town of Savona, near Genoa, whence the French name of soap, *savon*. Its manufacture spread in Spain and France. Marseilles became famous for its marbled soaps. Our word soap may come from the Latin *sapo*, which is mentioned by Pliny as an invention of the Gauls. As woollen garments preceded linen, so the fuller's art (for cleansing, scouring and



## THE ECONOMY OF PUMPING ENGINES.

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

The experiments tried on the Cornish engine at the East London Water Works, showed the following effects:—When there was no expansion, the duty done is taken as 100; it was when the steam expanded through 0.307 of the stroke, 162.6, and when through 0.687 of the stroke, 224. While speaking of trials, it is desirable to refer to a source of error existing in some of the reports of duty in Cornwall—that is, the inefficiency of pump valves. In the case of the Holmbush engine, the water actually raised was 14.7 per cent less than the calculated quantity adopted in reporting, and this loss appears to represent the quantity of water which ran back through the valves of the pump while they were closing; thus the duty represented by the steam power was 231,486,182 foot-pounds per 112 lbs. of coal, and the useful effect with Welsh coal, only 122,376,128 foot-pounds. This duty is high, but it must be mentioned that, when the trial was made, the engine had not long been erected, and was doing but light work—the diameter of the cylinder being 50 in., and stroke 9 ft. 1 in., while the horse-power was but 26.5 horses; thus the area of piston being 1,963.5 square inches, the allowance per horse-power would be 74 square inches, and the steam expanded through 0.83 of the entire stroke, or nearly five times its initial bulk, its pressure varying from 24.98 lbs. per square inch, down to 4 lbs. per square inch.

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

	Millions.
Boscawen, 70 in.	52.2
Chiverton, Cookney's 60 in.	57.0
Cargill Mines, Mitchell's 72 in.	58.6
Carn Brea, 76 in.	50.0
Cook's Kitchen, 50 in.	53.9
Crane, 70 in.	64.5
Great Wheel Busy, Harvey's 85 in.	63.2
Great Work, Leed's 60 in.	60.3
North Wheel Croft, Trevenson's 80 in.	52.0
South Wheel Frances, Marriot's 75 in.	55.9
West Caradon, Elliot's 50 in.	70.8
West Wheel Seton, Harvey's 85 in.	56.1
Wheel Ludcott, Wilcock's 50 in.	53.0
Wheel Margery, Wesley's 45 in.	55.6
Wheel Seton, Tilly's 70 in.	59.6
Wheel Tremayne, Mitchell's 60 in.	53.7

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

	Millions.
East London W. W., 80 in. Cornish.	97.1
East London W. W., 60 in. Boulton.	47.7
East London W. W., 80 in. C., highest duty.	103.0
East London W. W., 90 in. Wicksteed.	81.8
East London W. W., 90 in. with Welsh coal.	109.0

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

	Millions.
West's engine, 1 year's average.	83.5
Taylor's engine, 8 years' average.	93.1

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

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

The steam acts in raising a weight and drawing water from the well into the pump barrel, this latter item being small in proportion to the former; then, the pressure being equalized on both sides of the piston,

the weight which had been lifted falls, forcing the water through the outlet valve from the pump barrel, and drawing up the steam piston ready for another stroke. From Mr. Wicksteed's experiments on the 80-inch Cornish engine we quote the following particulars, to show the distribution of the steam power, averaging during the stroke those quantities which vary:—Preponderating weight, 55,401 lbs. or 11.037 lbs. per square inch of piston; water raised by engine, 4,125 lbs., or 0.821 lbs. per square inch; cold water pump, 186 lbs., or 0.037 lbs. per square inch; hot water pump, 6 lbs.; air pump, 591 lbs., or 0.117 lbs. per square inch; friction 1,009, lbs., or 0.200 lbs. per square inch; imperfect vacuum, 3,664 lbs. per square inch; total 64,982 lbs., or 12.94 lbs. per square inch steam pressure on the piston.

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

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

In entering upon the next branch of our subject, the question of finance, great caution is needed, as the means of obtaining correct information are very scarce, and, when found, give data rather perplexing to generalize, especially for comparison with those relating to double-acting engines. The figures, which will be quoted, are taken from actual practice, not mere estimates. In the first place, it will be necessary to come to some conclusion as to criteria of horse-

power of Cornish engines, as usually worked. For this purpose various particulars have been gathered, which tend to show that, taking a wide range of practice, there is, on the average, an allowance of about thirty square inches of piston surface per horse-power, and this does not appear unreasonable, as it corresponds to fifteen square inches per horse-power in a double-acting engine—the mean velocity of the piston on both strokes, and including stoppages at the end of each stroke, may be taken for an engine working regularly, as being about one hundred feet per minute, but in different engines the speed varies very considerably. Taking the allowance of thirty square inches per horse-power as granted, the mean cost of bright Cornish engines will be found to amount to about fifty-four pounds per horse-power, exclusive of boilers. This appears very heavy, but it applies to engines of average dimensions, and includes the pump work and duplicates of the valves; and of this amount the main pump work costs about twenty-five per cent, or about £14 10s. per horse-power, leaving, for the price of the engine proper, about £39 10s., or nearly four times as much as an ordinary horizontal engine would cost.

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

Total cost, average, of nine years.	18.114
Total cost, average, of five years.	21.336

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

Total cost, average, of nine years.	20.452
Total cost, average, of five years.	16.437

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

## THE EDUCATION OF ENGINEERS.

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

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



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

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

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

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

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

How, then, it will be asked, are we to proceed? We think by the following course:—Let the tyro be placed in such a position that he may have access to works, mechanical or civil, of magnitude and importance, use all endeavors to develop in his mind an interest in the general principles by which they are affected and the difficulties which arise during their progress; then let him study theory for each case as

it arises, merely to enable him to understand those principles, and their application. Thus if he is diligent and intellectual, he will have most strongly impressed upon his mind the necessity of ascertaining and overcoming obstacles which can only be understood by inspection, and will value abstract science rightly as his guide in completing such projects as he may undertake. If, on the other hand, he is not diligent and intellectual, there is but one remark to make—let him not attempt to enter the profession.

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

#### FARMERS' CLUB.

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

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

##### KEEPING HORSES IN BASEMENTS.

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

##### ONE THOUSAND DOLLARS PER ACRE FOR STRAWBERRIES.

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

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

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

##### THE BOMBARDIER.

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

##### MAKING MAPLE SUGAR IN THE FALL.

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

##### TRENCHING FOR GRAPES.

Mr. Quinn remarked that the strong assertions which had been made by writers, and by some successful cultivators, that grapes could not be grown

unless the ground was spaded two spades deep, had deterred many persons from undertaking the culture. He had found that this deep spading is unnecessary. If the ground is thoroughly and deeply plowed and manured the grapevine will yield a good crop.

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

##### GENERAL ROTTING OF THE GRAPES.

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

#### Important Experiments with Protected Gunpowder.

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

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

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

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

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



## ANNUAL OF SCIENTIFIC DISCOVERY.

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

## A NEW APPLICATION OF THE SLACKING OF QUICKLIME.

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

## SILK NATURALLY DYED.

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

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

The paper or parchment written on is first left for some time in contact with distilled water. It is then

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

## PURE WATER FROM LEAD PIPES.

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

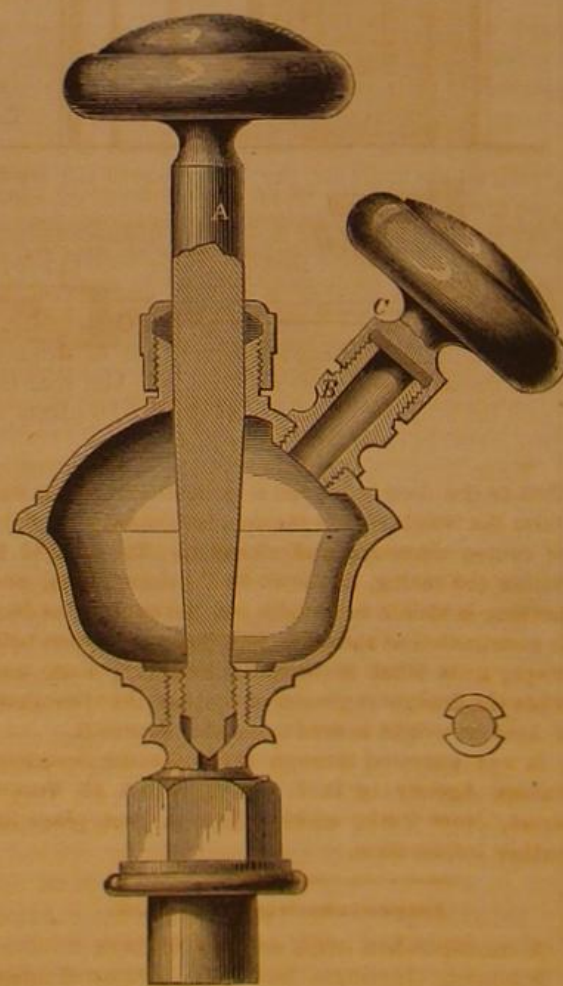
## NEW METHOD OF DETECTING POISONS IN THE ANIMAL ECONOMY.

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

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

## BROUGHTON'S GRADUATING LUBRICATOR FOR STEAM ENGINES.

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



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

It consists of a reservoir, with a stuffing box at top and a solid central stem, A, passing through the top of the reservoir, and screwing by a thread on its lower end directly into the shank, where it forms an

internal valve in connection with a seat in the shank. There is also an auxiliary opening, B, for filling which is closed by a tubular cap, C.

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

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

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

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

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

## New Silk Factory.

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

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

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



## PHOTOGRAPHING THE MOON

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

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

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

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

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

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

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

## STAGG'S SELF-CLOSING DOOR.

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

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

Fig. 1

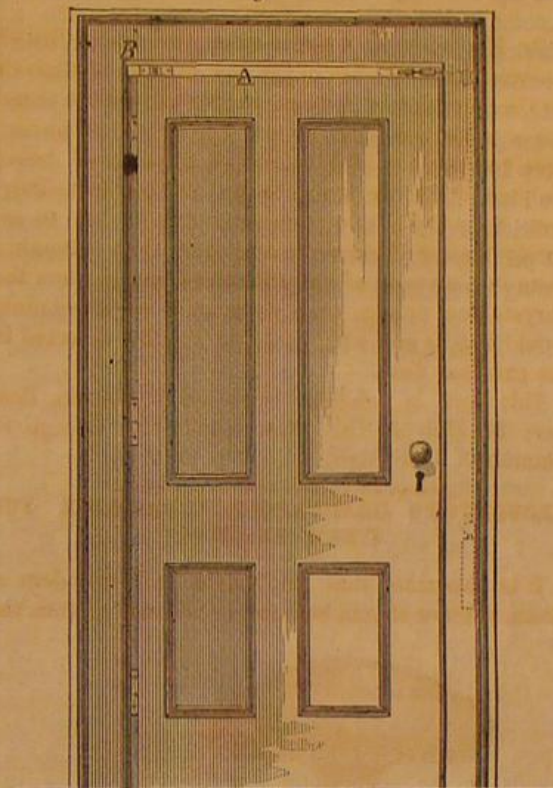
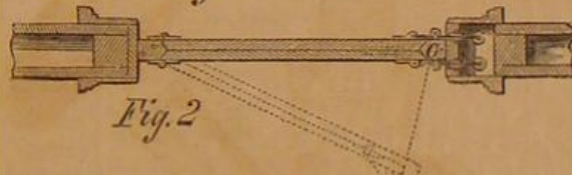


Fig. 3



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

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

## Improvements Suggested.

A correspondent sends us the following:—

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

HORSESHOES.—In Paris horseshoes may not be roughed, because that wears out the macadamized paving so general on the great thoroughfares of that city; but it tells fearfully on horses. Paris would reward the inventor who would contrive a shoe which, without having picking projections, would yet have

bite enough to keep from slipping. Intervening strips of steel might, by the quicker wearing down of the softer iron, keep up the required edge, and not be too costly.

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

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

ANTHRAX.

## SPECIAL NOTICES.

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

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

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

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

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

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

## Valuable Recipes.

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

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

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

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

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

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





### \$10,000 for a Cotton Picker.

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

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

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

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

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

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

### The "Agamenticus."

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

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

R. B. FORBES.

Boston, Mass., August 19, 1865.

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

well known that this will cause the copper to foul, but so will the rusting of the iron armor plate.—Eds.

### Why Does Sound Travel Better Just Before a Storm?

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

J. G. KONVALINKA.

New York, August 17, 1865.

### A Problem.

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

W. A. B.

New York, August 15, 1865.

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

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

### An Idea for Cotton Planters.

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

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

J. H. G.

Pennsylvania, August 11, 1865.

### India-rubber Covers for Cans Wanted.

Messrs. Editors:—I write to ask if there are such things as gum-cloth covers for sealing fruit; and if

there are not, to suggest that some be made as soon as possible. They can be similar to nursing tubes for infants. Many persons tie the gum-cloth over their jars, which goes to prove that the thing is feasible, but if they were to be made to stretch over and stay they would be infinitely better.

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

D. B.

New Hope, Pa., August 12, 1865.

### The Law of Sex.

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

MILLER, WOOD & CO.,

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

New York, August 4, 1865.

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

### A Convenient Disinfectant.

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

R. H. A.

Baltimore, Md., August 19, 1865.

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

### Drying by Steam.

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

GEO. P. LEONARD.

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

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

### Substitute for India-rubber.

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



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

JAMES HANSBROOK.

Cincinnati, August 13, 1865.

#### Results of the War.

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

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

Louisville, Ky., Aug., 1865.

#### Of a Tool Above or Below the Center.

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

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

G. D. HISCOK.

No. 76 John street, New York.

#### SOUTHERN PATENTS.

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

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

#### RECENT AMERICAN PATENTS.

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

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

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

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

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

**Rose Engine.**—This invention relates to certain improvements in rose engines intended for cutting glass, and it consists in the use of a parallelogram, the sides

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

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

#### MISCELLANEOUS SUMMARY.

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

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

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

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

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

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

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



**Improved Car Shackle.**

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

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

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

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

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

**New Process of Picture Cleaning.**

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

**French Ironclads.**

A letter from Toulon says:—"The Administration of the Marine has just received a fresh supply of plates destined for the steam ram *Taureau*. This vessel has already absorbed 162 plates of 12 centimeters thick

(about 4½ inches), the price of which amounted to 380,000 fr. Two frigates of the type of the *Gloire* and the *Provence* are covered with a cuirass valued at 800,000 fr., but since the invention of the new system of destruction, now in course of trial in every navy, it has been thought fit to augment in proportion the means of defense, and henceforward the protecting plates will have a thickness of 20 centimeters instead of 12. The first experiment will take place in the *Marengo*, ship-of-the-line, now being built at the Mourillon, and it appears that the novelty above-

They will be anchored into the abutments on Oil City side, and with separate anchorage masses on the Lantonia side.—*Oil City Register*.

**20,000 Tons of Rock at a Blast.**

The breakwater now being erected at the picturesque Port Erin Bay, in the Isle of Man, at a cost of nearly £60,000, is making great progress. Port Erin Bay is an almost naturally-formed harbor of refuge, requiring merely the breakwater now being erected in front of part of the entrance to completely land-lock it. The adjoining coast is very rocky and precipitous, and therefore the Port Erin Harbor of Refuge will be of great service, especially to the immense herring fleet belonging to the island, and also to the shipping, lying, as it does, right in the track of the American and Irish traders. During the last few weeks Mr. Matthews, the engineer of the works, has been superintending preparations that have been actively made to clear away by explosion an immense mass of rocks which interfered with the progress of the works. For this purpose fourteen chambers, each about 25 feet deep, were drilled into the solid rocks, which are so hard that it fully occupied the time of three men several days to drill each chamber. In each chamber was deposited 50 lbs. of gunpowder, so that altogether 700 lbs. of powder were used. The discharge of such a large quantity of powder, and

the upheaval of such an immense mass of rocks as it was expected the explosion would clear away, made it necessary that extreme caution should be exercised in order to guard against accidents; and, therefore, the fact that such an operation was to take place was generally kept secret. In spite, however, of the determination to keep the matter as quiet as possible, it somehow or other "got wind," and, consequently, a large number of persons, among whom were many of the principal gentlemen of the island, assembled to witness the explosion. Fourteen men were told off to fire the fuses, and at a given signal they attached the matches and quickly retired. The result is thus described by an eyewitness:—"In a very short time, during which the spectators held their breath from exciting expectancy, about half a dozen of the chambers exploded, and, with a dull, heavy boom hurled out an immense body of rocks. After a brief pause the earth again trembled, and the bosom of the adjoining ocean heaved, as the remaining chambers went off with a force that made you fancy you were in the vicinity of an earthquake during an eruption. The grand result was that about 20,000 tons of solid rock were torn from the position they had held for countless ages and hurled on to a roadway which, a few minutes before, had been as clear as a high road.—*Manchester (England) Courier*.

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

Fig. 1

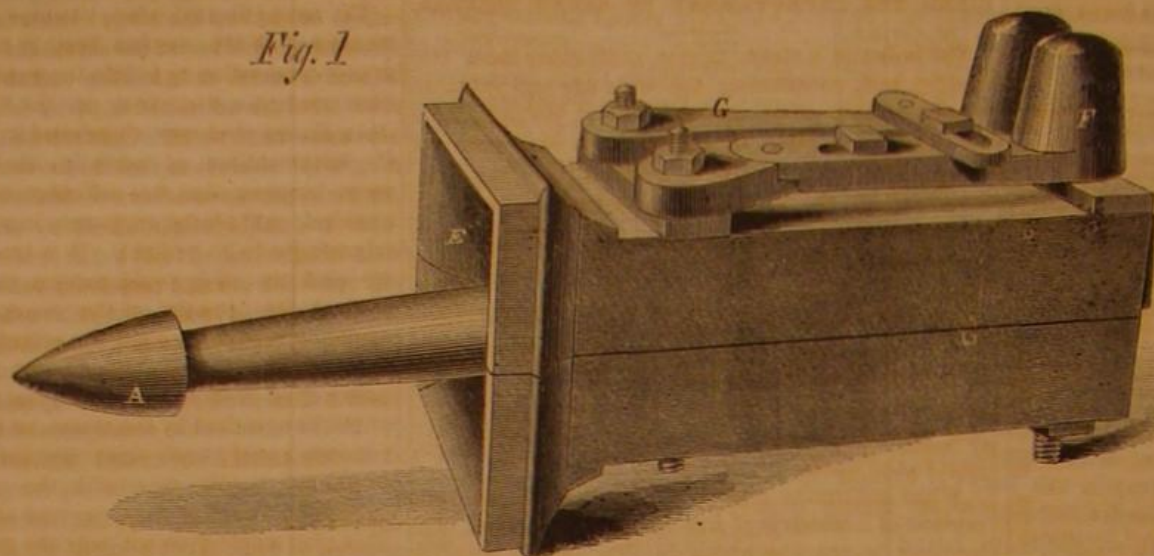
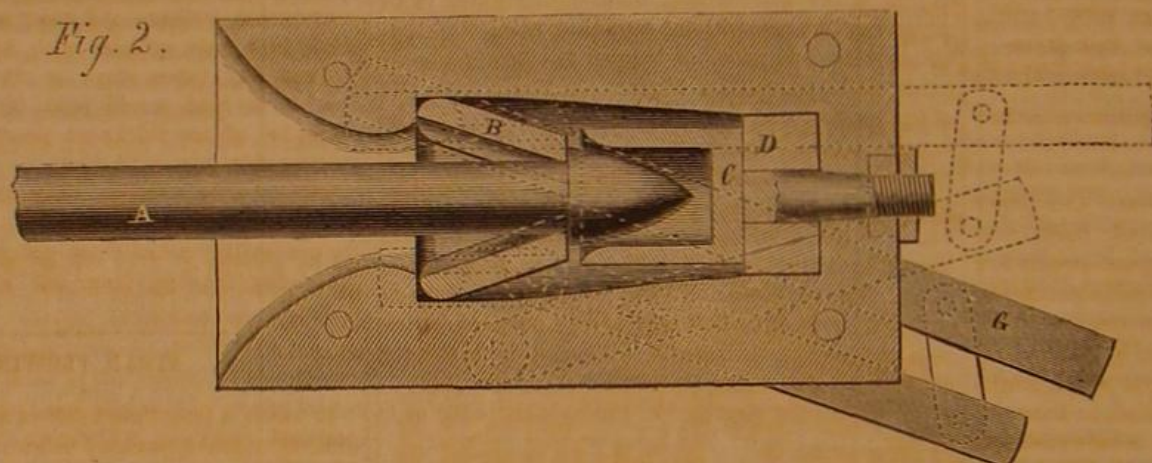


Fig. 2

**CLINTON'S CAR SHACKLE.**

mentioned will not be the only one. This ship, it is said, will carry a battery of twelve cannon only, but they will be of stupendous bulk and bore.

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

**SHIP-BUILDING IN BOSTON.**

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

**New Suspension Bridge.**

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



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## TWENTY YEARS.

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

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

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

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

Finally, the last twenty years, besides many minor discoveries in science, have developed one which ranks among the most sublime triumphs of the human mind. By means of spectrum analysis, the chemist conquers the immeasurable distances which stretch between us and the fixed stars, and even the far greater spaces which divide us from the nebulae, and learns with

certainly what are the elementary substances which make up the constitution of those remote bodies.

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

## FIELD FOR IMPROVEMENT IN STEAM BOILERS.

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

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

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

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

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

The transfer will also be proportioned to the rapidity of the circulation. Water is one of the poorest conductors of heat, and if a stratum next the plate remains in its position, so soon as it is heated to the temperature of the plate the transfer of heat ceases, or goes on with the slowness with which heat

is conducted away by the water; but if the instant a particle of water is heated, it is replaced by the coldest one in the boiler, the transfer of heat goes on with the greatest possible rapidity. In plain kettles, heated from the bottom, the ebullition creates a very active circulation; but in small tubes, if the bubbles of steam are passing in one direction and the water in the opposite, the circulation is seriously impeded. Inclining the tubes, as in Dickerson's boiler, is an exceedingly simple and effectual means for producing the most active circulation, and is probably destined to be very generally adopted.

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

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

## STEAM PLOWING.

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

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



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

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

#### A NOVEL PATENT CASE IN ENGLAND.

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

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

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

#### Working Early and Late.

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

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

#### PRINCIPAL ARTICLES OF TAXATION.

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

Articles.	Annual Tax.
Distilled spirits.....	\$28,431,797 83
Tobacco (manufactures of).....	7,086,684 74
Cotton goods.....	3,717,433 87
Leather.....	3,548,176 51
Iron manufactures.....	3,202,865 14
Fermented Liquors.....	2,223,719 73
Petroleum.....	2,201,573 20
Wood wares.....	1,679,940 25
Cotton (raw).....	1,268,412 56
Sugar (raw).....	1,267,616 28
Cigars.....	1,255,424 89
Paper and manufactures of.....	911,914 72
Sugar (refined).....	873,139 85
Gas.....	714,740 13
Wool (manufactures of).....	647,246 61
Coal.....	572,436 54
Confectionery.....	465,793 15

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

#### NEW BOOKS AND PUBLICATIONS.

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

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



ISSUED FROM THE UNITED STATES PATENT-OFFICE FOR THE WEEK ENDING AUGUST 22, 1865.

Reported Officially for the Scientific American.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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



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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

First, I claim the fixed central fountain or isolated stand, A, the

same being constructed substantially in the inverted top form shown, and also provided with the recesses, a', basins, a2, water supply spouts, a3, connecting with supply pipes passing up through the stand to the same, and the waste pipes passing down through the stand from the said basins, all as described and set forth, for the purpose specified.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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



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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

# 49,562.—Brick Machine.—Samuel Shreffler, Joliet, Ill.:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

# 49,585.—Electro-magnetic Telegraph.—Robert Boyle (assignor to himself and Giuseppe Tagliabue), New York City:

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

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

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

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

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

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

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

Eighth, The sleeve, c2, carrying the escapement wheel, b2, and hair spring, d2, in combination with type-wheel shaft, f2, wheel, g2, pinion, j2, crown wheel, y2, and oscillating fork, a2, constructed and operating substantially as and for the purpose described.

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

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

Eleventh, The escapement wheel, J2, and electro-magnet, K2, in combination with the dog, t2, arm, w2, spring, v2, and printing block, F2, constructed and operating substantially as and for the purpose set forth.

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

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

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

Fifteenth, The oscillating shaft, x2, carrying the dog, b3, and arm, y2, in combination with the wheel, w2, escapement wheel, J2, and type wheel, D'', constructed and operating substantially as and for the purpose set forth.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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



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

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

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

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

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

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

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

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

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

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

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

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

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

#### REISSUES.

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

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

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

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

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

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

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

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

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



## PATENTS

GRANTED

## FOR SEVENTEEN YEARS.

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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-HALF 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 eighteen 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 ex-Commissioners of Patents.

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CHAS. MASON.

[See Judge Holt's letter on another page.]

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,

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

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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.

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Persons desiring to file a caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. The Government fee for a caveat is \$10. A pamphlet of advice regarding applications for patents and caveats is furnished gratis, on application by mail. Address MUNN & CO., No. 37 Park Row, New York.

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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.

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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.

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Every applicant for a patent must furnish a model of his invention is 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 no little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park Row, New York.

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On filing application for Design (seven years).....	\$15
On filing application for Design (fourteen years).....	\$30

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

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

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

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

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

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

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

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

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

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

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

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

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

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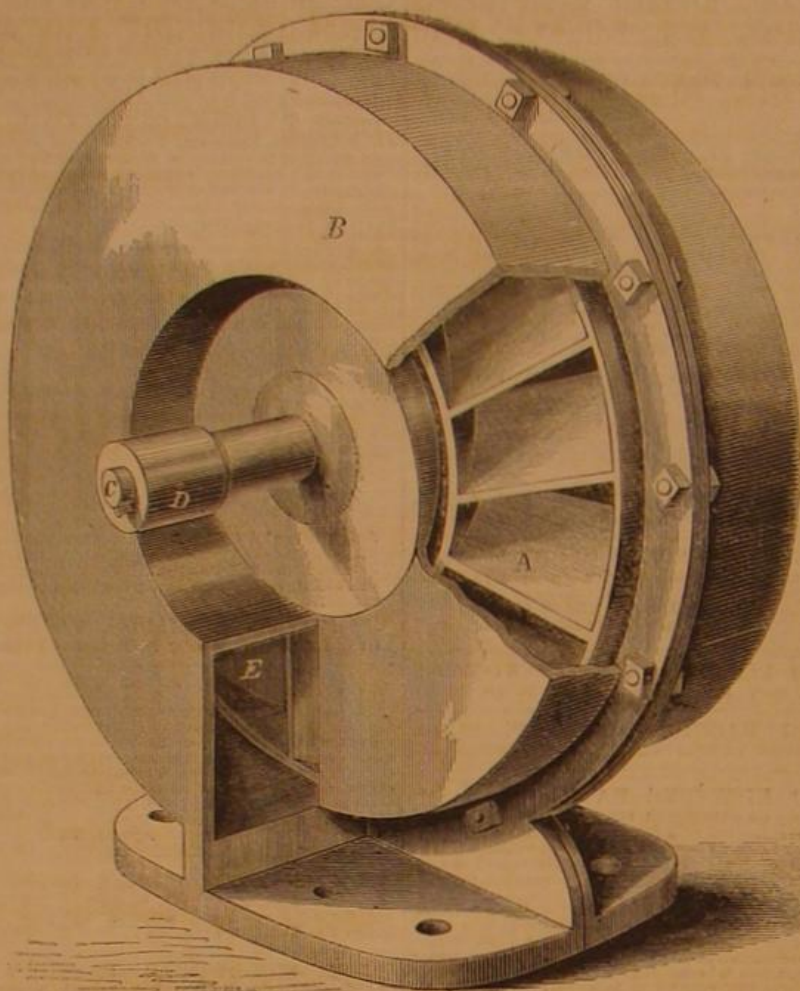
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**FARMER'S FAN BLOWER AND EXHAUST.**

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

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

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

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

**Inventors and Their Inventions.**

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

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

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

This invention was patented through the Scientific

American Patent Agency. For further information address D. I. Stagg, No. 15 Morton street, New York.

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THE ANNUAL  
PROSPECTUS.

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

Vol. XIII—No. 11.  
(NEW SERIES.)

NEW YORK, SEPTEMBER 9, 1865.

\$3 PER ANNUM  
IN ADVANCE.

## Elevated Railway for Broadway.

The inventor of this railway, Mr P. Andrew, of Cincinnati, Ohio, has kept three things constantly in view, which he claims, as follows:—First, a light superstructure; second, one that would occupy the least space; third, a capacity for carrying passengers adequate to the requirements of Broadway.

A single row of pillars, A, support four tracks—the two upper tracks form a distinct roadway, the two lower ones another—each having an up and a down track. The pillars are placed on the outer edge of the sidewalk, in range with the line of curbstones, having sills cast upon them that extend the length of the arms that sustain the tracks, and in the same direction; these are bolted upon heavy blocks of stone, B, that are placed beneath the sidewalk extending under the street. As will be seen in the engraving, the pendent parts, C, of the arms have projections for the outer rails of the lower tracks, the inside rails are supported from projections from the pillars; upon these projections are placed the chairs upon which the rails rest and are fastened. The chairs for the upper rails are placed upon the upper edge of the arms. The rails are supported by truss rods, D, the ends of the rods being screwed or fastened into the chains.

For the purpose of reducing the car to the smallest space, it is made the width of a seat for two persons, the seat being placed across the car, and doors on the sides of the car for each seat, thus affording easy facility for egress and ingress. The lower cars are suspended from the lower tracks, the wheels being attached to the top of the car; the upper cars run upon the rails as upon other railways. All the cars are propelled by a succession of endless ropes, E, which are sustained at intervals by grooved wheels, F, that are fastened to the lower edge of the arm. The ropes will run the distance of two squares, or a greater distance, if found practicable.

The engines for propelling the ropes are placed under the sidewalk or in the cellars, putting in motion a vertical shaft, G, to which the rope-propelling machinery is attached; this machinery is simple, being two spur wheels, H, above two grooved ones that grasp the rope, so arranged by levers that the grooved wheels tighten upon the rope in proportion to the weight drawn. Each engine will propel two ropes; if the ropes extend 800 feet, the engines will be placed four squares apart.

The machinery for attaching the car to the rope is also simple, and so arranged as to prevent any shock

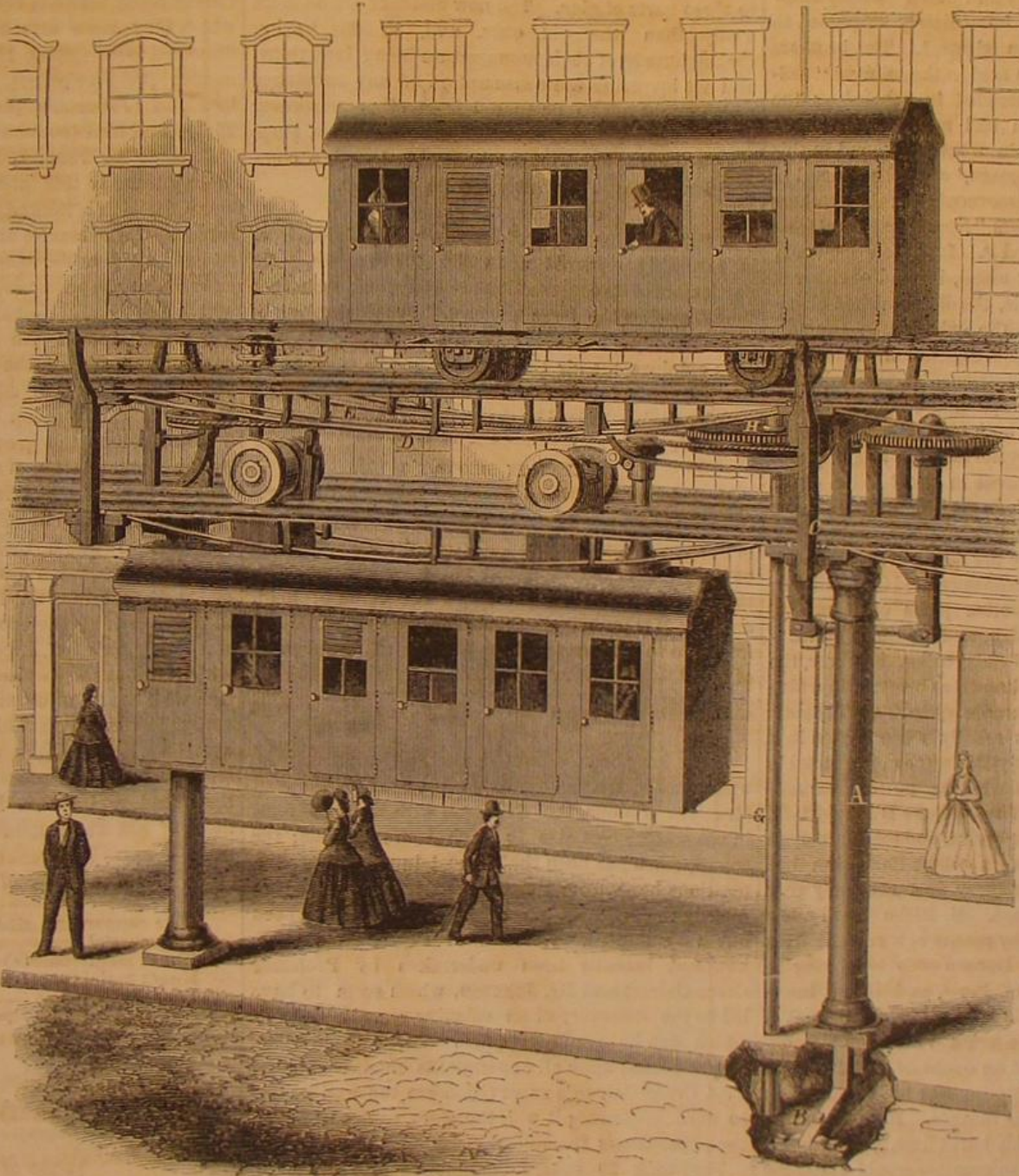
at the starting of the car; the rope is permitted to slip until the car has attained the momentum of the rope. When started the car will proceed to the end of the railway without stopping or requiring the attention of any one, acting automatically—releasing its hold upon one rope, seizing the next in succession unless it is stopped at the stations, being entirely

a light and beautiful appearance; but should it be built supported by pillars, except at the crossing of the streets—as shown in the engraving—it would be, if properly and tastefully constructed, ornamental instead of unsightly, occupying but little space and in no way obstructing the light or darkening the lower stories of the houses.

Those who are desirous of relieving Broadway, and are seeking some means of doing so, should not fail to see the model now in a room of the New York Association for the Advancement of Science and Art, in the Cooper Institute, in care of Dr. L. D. Gale, general secretary of the Association.

## Wire Rigging.

We see it stated in one of our cotemporaries—arguing the advantage of wire rigging for ships, and showing the extent to which it is used in Europe—that we have no similar employment for the same article in this country, and that it is not manufactured here. This is a mistake. Wire has not replaced rope so largely in the rigging of our merchant and naval marine as in Europe, because hemp has been cheaper here than it is there, and because economy has not been so much studied by us as by foreign nations. It is, however, coming into greater use, and ships may be found along our wharves and piers almost daily which are supplied with wire rather than rope rigging. As every day sees the increase of the change, it is reasonable to presume that soon we shall be as well supplied as Europe is in this respect.



ANDREW'S ELEVATED RAILROAD.

under the control of the person who attends to the stopping and starting of the cars. It is proposed, instead of sending conductors with the cars, to have two persons at each station—one to stop and start the cars, the other to receive tickets; if it is found necessary a conductor may be sent with each car, who can stop or start it at pleasure by pulling or releasing a cord pendent from the top of the car.

Such is the construction of the railway that the cars cannot be run off the tracks; they are removed from one track to the other, at the ends of the road, by a sliding table, and in the same way may be removed at intermediate points, from track to track, or taken from the tracks, when necessary, and placed in depots.

The streets are crossed by suspending the frames that support the tracks in the manner of a suspension bridge. Should it be deemed preferable the whole railway can be built in this way, and present

There is at least one establishment in this State devoted to the manufacture of wire rigging, and one has long been in operation in New Jersey. Both are partially deprived of business now by reason of the war, or rather have been, for business of all kinds is growing, and in the aggregate that of shipbuilding, and consequently the employment of rigging. It is manufactured of all sizes, from sash cords to wire two inches in diameter, and, of course, has an unequalled strength and durability. Beside its chief application, to the rigging of ships, it is employed in warehouses, mines and quarries, for guys to derricks and cranes, and for various other purposes.

We are gratified to see that the manufacture, which for many reasons is growing and important, has been domesticated with us, and hope there may be that success attending it which has been reached in England, and, to a less extent, by other countries. The effect will shortly be perceptible upon our commerce,



if that degree of wisdom attends mercantile builders which is to be expected, and which has been proved by abundant trials elsewhere; while the fabrication will add a growing value to that peculiar business which must always remain at home most in Pennsylvania. The people of New England contemplate establishing a wire-rigging factory in Maine. If the right steps are taken seasonably here there will be no occasion for their doing so, since the material is at hand here which must be transported there, and our knowledge of the business exceeds theirs by a large amount.—*Phila. Gazette.*

#### NOTES ON NEW DISCOVERIES AND NEW APPLICATIONS OF SCIENCE.

##### TUNGSTEN OR WOLFRAM.

There seems some probability that metallic tungsten may shortly be introduced into commerce and the arts. This metal was first isolated in 1783, by two Spanish metallurgists, the brothers D'Elhujart. Two years previously Scheele had discovered in the Swedish mineral "tungsten" (so named on account of its density, "tung" meaning heavy and "sten" stone) a new acid, which Bergmann had immediately suspected to belong to a new metallic element. The brothers D'Elhujart found this same acid in the mineral "wolfram," and at length succeeded in separating the metal from it. Bergmann had suggested that the metal which he felt certain would be found in this acid should be called "tungsten," after the mineral in which the acid was first discovered; but the brothers D'Elhujart named it "wolfram," from the mineral from which they actually obtained it. It was subsequently proposed to use for the new metal, instead of either of these names, that of Scheele, the distinguished chemist who had first detected the existence of tungstic acid, but "Berzelius set this suggestion aside, with the just remark that his countryman's immortality required no such artificial prop," and the names tungsten and wolfram are now both used, the metal being usually spoken of by the former name in England and France, and by the latter name in most other countries. The mineral which is called wolfram is a double tungstate of iron and manganese, and usually contains about seventy-five per cent of tungstic acid. It is found in Cornwall, Devonshire, and Cumberland; in Bohemia, Saxony, and other parts of Germany, and also in France, Sweden, and South America—England, Sweden, and Bohemia, being, however, the only countries, so far as is known at present, in which it occurs in any considerable quantity. Tungstic acid is reduced somewhat readily when heated in a current of hydrogen, but by this method the metal is obtained only as a dense dark-gray powder, exceedingly difficult of fusion. The brothers D'Elhujart did not succeed in fusing this powder, and there are upon record only two instances in which its fusion has been effected at all, and in those instances only very small quantities were fused. M. Riche fused a few grammes some years ago by means of a current from a battery of two hundred Bunsen cells belonging to the Faculty of Science of Paris, and in the International Exhibition of 1862 was a very small button of tungsten which Mr. Frederick Versmann had obtained by subjecting about an ounce of the powder for three hours to the most intense heat he could obtain by means of a powerful gas furnace. He used for the purpose a crucible of freshly burnt lime, having found that no graphite or Hessian crucible would stand the requisite heat. We now learn that a Swedish metallurgist has discovered a method of reducing tungsten by which he obtained it at once in a state of fusion, and that ingots of the pure metal weighing several pounds each are now on exhibition at Stockholm. We are informed, too, that the cost of obtaining tungsten by the new method does not exceed a few shillings per pound. If really obtainable thus cheaply, a metal which will bear exposure to so intense a heat without undergoing either fusion or oxidation must prove of incalculable value to certain of the arts, provided that the difficulties in the way of working it are not insuperable. With the exception of gold and platinum, tungsten is the heaviest metal yet known. Its specific gravity is about 18, that of gold being 19.36, and that of platinum 21.53.

##### MATCHES WITHOUT PHOSPHORUS.

We had occasion, some months ago, to draw attention to the terrible effect upon the health of the workmen engaged in the manufacture of the phos-

phorus which enters into the composition of the lucifer matches at present in use, and to mention that Dr. Hierpe, of Stockholm, was engaged in an earnest endeavor to discover some means of producing effective friction matches without the aid of a substance the whole of our supply of which ought to be devoted to the fertilization of the soil, and which, when employed in the arts in the free state, is so frightfully injurious to those who are unfortunate enough to have to manipulate it.

Dr. Hierpe has since patented, both in Sweden and some other continental countries, a composition for the tips of friction matches, consisting of a mixture of four to six parts of chlorate of potash with two parts of bicarbonate of potash, two parts of either peroxide of iron, protoxide of lead, or deutoxide of manganese, and three parts of glue or other cement. Matches tipped with this composition will only ignite when rubbed upon a surface specially prepared. For this igniting surface Dr. Hierpe uses a mixture of twenty parts of sulphide of antimony with two to four parts of bicarbonate of potash, four to six parts of either oxide of iron or oxide of lead, and from two to three parts of glue. The new matches are no more costly than the old ones, and, besides having the advantage of their manufacture being innocuous, and not involving the consumption of any substance which ought not to be spared from other purposes, are immensely safer than our ordinary matches, since they will not ignite except when rubbed upon a composition prepared expressly for the purpose.

##### GUN-COTTON ENGINE.

A "gun-cotton engine," invented by M. Jules Gros, is favorably reported upon by *Les Mondes*. No particulars of its construction are given, but we gather that it applies the force generated by combustion of gun-cotton to the compression of atmospheric air, and then employs the air thus compressed to work a piston. Its principle is thus the same as that of a gun-powder engine devised by the writer of these "Notes" some five years ago.

##### IRON IN BLOOD.

M. Pelouze has been making investigations respecting the quantity of iron contained in the blood of different animals. He finds that the blood of birds contains, per ten thousand parts by weight, from three to four parts of iron, and the blood of man, and that of mammiferous animals generally, contains from five to six parts of iron per ten thousand parts of blood.—*Mechanics' Magazine.*

##### Galvanized Iron as a Ship-building Material.

It has long been admitted that, although iron is, undoubtedly, the most suitable material for the construction of ships, the readiness with which it fouls in sea water gives rise to much inconvenience; the consequence has been that almost innumerable compositions have, from time to time, been proposed to remedy the evil; yet the success obtained has been but very limited. A series of experiments have, however, recently been undertaken by Professor Crace-Calvert and Mr. Johnson, which seem to have led to the discovery of an effective remedy, and one which can be readily applied. The reliance which can be placed upon all experiments conducted under Prof. Crace-Calvert's supervision are too well known to need comment; it will, therefore, suffice to record the experiments themselves.

They took 20 square centimeters of each metal, which they cleaned with great care and attention, in order that the action of the sea water might have its full effect; then two plates of each metal were placed in separate glass vessels, and immersed in equal volumes of sea water. After one month the plates were taken out, and any compounds that had adhered to the surface carefully removed; the plates were then dried and re-weighed, and the loss estimated. To render their results of more practical value, they calculated the action of 100 liters of sea water upon 1 square meter of each metal, and found the amount of metals dissolved to be—Steel, 29.16 grammes; iron, 27.37; copper (best selected), 12.96; copper (tough cake), 13.85; zinc, 5.66; galvanized iron 1.12; block tin, 1.45, and stream tin, 1.45 grammes. Of virgin lead and of common lead the quantity dissolved was merely a trace. The conclusions to which these results obviously lead are that steel is the metal which suffers most from the action of sea water, and that iron is most materially pre-

served from the action of sea water when coated with zinc, and, therefore, not only should iron exposed to the action of sea water be galvanized whenever this is practicable, but, in their opinion, it would amply repay ship-builders to use galvanized iron as a substitute for that metal itself.

The extraordinary resistance which lead offers to the action of sea water naturally suggests its use as a preservative to iron vessels against the destructive action of that element; and though they are aware that pure lead is too soft to withstand the wear and tear which ships' bottoms are subjected to, still they think that an alloy of lead could be produced which would meet the requirements of ship-builders. Feeling that experiments made with a limited amount of sea water might not be a fair criterion of the action of the ocean upon metals, they repeated their experiments upon plates of 40 centimeters square, which were immersed for one month in the sea on the western coast (Fleetwood), taking the precaution that they should be constantly beneath the surface of the water, and suspended by flax rope attached to a wooden structure, to prevent any galvanic action taking place between the plates and the structure to which they were attached. The amount of metals dissolved were—Steel, 105.31 grammes; iron, 99.30; copper (best selected), 29.72; zinc, 34.34; galvanized iron (Johnson's process), 14.42; lead (virgin), 25.69; and lead (common), 25.85 grammes.

It is to be remarked that the action was much more intense in this instance than when the metals were placed in a limited amount of water at the laboratory. These results are due, probably, to several causes acting at the same time—that the metal was exposed to the constantly renewing surface of an active agent; and that there was also a considerable friction exerted on the surface of the plate by the constant motion of the water, there being at Fleetwood a powerful tide and rough seas. What substantiates this opinion is that the lead plates undoubtedly lost the greater part of their weight, not by the solvent action of the sea water, but from particles of lead detached from them in consequence of their coming in contact with sand and the wooden supports to which they were attached; but this cause of destruction having been observed with lead plates, it was afterward carefully guarded against in the case of all the other metals.

Another series of experiments was likewise made, which cannot fail to prove of great value in connection with the application to ships' bottoms of copper and yellow metal sheathing—the action of sea water upon various brasses was carefully tested. They immersed for one month plates of various alloys in that fluid, and it was found that the action of 200 liters of sea water upon one square meter of surface was:—

##### COMPOSITION OF THE BRASSES.

	Copper.	Zinc.	Iron & Lead.
Pure copper and zinc.....	50.0	50.0	...
Commercial brass.....	66.0	32.5	1.5
Muntz metal (sheets).....	70.0	29.2	0.8
Muntz metal (bars).....	62.0	37.0	1.0
Prepared brass.....	50.0	48.0	*

\*And 2 per cent of tin.

##### QUANTITY OF METALS DISSOLVED.

	Iron.	Copper.	Zinc.	Total.
Pure copper and zinc.....	1.110	10.537	11.647	
Commercial brass.....	0.579	3.667	3.324	7.570
Muntz metal (sheets).....	0.438	4.226	2.721	7.385
Muntz metal (bars).....	0.501	2.697	3.493	6.691
Prepared brass.....	+	7.040	3.477	10.582

+0.365 of tin dissolved.

This table shows how very different sea water acts upon divers brasses, and the influence exercised upon the copper and zinc composing them, by the existence in them of a very small proportion of another metal; thus, in pure brass the zinc is most rapidly dissolved (which, *en passant*, is the contrary to what takes place in galvanized iron), while it acts as a preservative to the copper. Tin, on the other hand, appears to preserve the zinc, but to assist the action of sea water upon the copper. The great difference between the action of the sea water upon pure copper and upon Muntz metal seems to us to be due not only to the fact that copper is alloyed to zinc, but to the small proportion of lead and iron which that alloy contains; and there can be no doubt that ship-builders derive great benefit by using it for the keels of their vessels. They were so surprised at the inaction of sea water upon lead, that they were induced to compare its action with that of several distinct varieties of water—Manchester Corpora-



tion water, well water, distilled water in contact with air, and the same deprived of air; and the figures obtained confirmed their previous result, that sea water has no action on lead, except what arises from friction.—*Mining Journal*.

#### A New Explosive Substance.

Glycerine, as we all know, is the sweet principle of oil, and is extensively used for purposes of the toilet, but it has now received an application of rather an unexpected nature. *Galvani* states that in 1847, a pupil of M. Pelouze's, M. Sobrero, discovered that glycerine, when treated with nitric acid, was converted into a highly explosive substance, which he called nitro-glycerine. It is oily, heavier than water, soluble in alcohol and ether, and acts so powerfully on the nervous system that a single drop placed on the tip of the tongue will cause a violent headache that will last for several hours. This liquid seems to have been almost forgotten by chemists, and it is only now that Mr. Nable, a Swedish engineer, has succeeded in applying it to a very important branch of his art, viz., blasting. From a paper addressed by him to the Academy of Sciences, we learn that the chief advantage which this substance, composed of one part of glycerine and three of nitric acid, possesses, is that it requires a much smaller hole or chamber than gunpowder does, the strength of the latter being scarcely one-tenth of the former. Hence the miner's work, which according to the hardness of the rock, represents from 5 to 20 times the price of gunpowder used, is so short that the cost of blasting is often reduced by 50 per cent. The process is very easy. If the chamber of the mine present fissures it must first be lined with clay to make it water-tight; this done, the nitro-glycerine is poured in and water after it, which, being the lighter liquid, remains at the top. A slow match, with a well charged percussion cap at one end, is then introduced into the nitro-glycerine. The mine may then be sprung by lighting the match, there being no need of tamping. On the 7th of June last three experiments were made with this new compound in the open part of the tin mines of Altenburg, in Saxony. In one of these a chamber 34 millimetres in diameter was made perpendicularly in a dolomitic rock 60 ft. in length, and at a distance of 14 ft. from its extremity, which was nearly vertical. At a depth of 8 ft. a vault filled with clay was found, in consequence of which the bottom of the hole was tamped, leaving a depth of 7 ft. One liter and a half of nitro-glycerine was then poured in—it occupied 5 ft.; a match and stopper were then applied as stated, and the mine sprung. The effect was so enormous as to produce a fissure 50 ft. in length and another of 20 ft.; the total effect has not yet been ascertained, because it will require several small blasts to break the blocks that have been partially detached by this.—*Mechanics' Magazine*.

#### Work in Machine Shops.

The Providence Steam Engine Company, of Providence, R. I., the builders of the engines of the United States steamers *Pawtuxet* and *Algonquin*, are now engaged upon two pair of sixty-inch cylinder engines for the new fast sloops in process of construction. They are also building a pair of engines with twenty-three inch cylinders and four-feet stroke, and a high-pressure engine with twelve.

The Corliss Engine Company, of Providence, perhaps cover a larger area of ground than any shop in the country; all of its buildings, however, are only one story in height. They are building two pair of sixty-inch and one one hundred-inch engines for the new sloops and the frigate *Pompanoosne*. This company built the engines of the United States steamer *Saco*; a portion of them are now being overhauled at the shop. One of the noticeable things to be seen here is a condenser casting, all in one piece, weighing thirty-two thousand five hundred pounds; it is truly a fine piece of work. All of the other shops cast them in two pieces.

The Hope Iron Company, of Providence, is busily engaged in building the American Ship Windlass Company's windlass, a machine which has found such favor as to be in use on board of nearly five hundred vessels. It is a great improvement on the English windlass, which has been in use so many years on our vessels. With this American machine a less number of men are required; it is simple, powerful,

and less liable to get out of repair than any in use. At times, the safety of the vessel, her cargo, and hundreds of valuable lives depend upon the windlass, and it is the duty of ship-owners to put on board their vessels the best of such an important part of a vessel. The Hope foundry are building an experimental engine, for their own use, upon a new, and which seems to be a practical, idea. They are also constructing a caloric engine, which is destined to throw the Ericsson machine into the shade completely.

The Wilmington Iron Works, Pusey, Jones & Co., Wilmington, Delaware, are constructing the machinery for the iron-clad *Shackamaxon*, building at Philadelphia. The machinery is from the designs of John Baird, and consists of two pair of direct-acting engines having cylinders 46½ inches in diameter and 50 inches stroke of piston. Each pair of engines will drive a screw of 15 feet in diameter. There are eight horizontal tubular boilers, each 20 feet 4 inches wide, 13 feet long, and 14 feet high, together having a heating surface of 22,500 square feet. They are also building two iron side-wheel steamers to run on the Cape Fear river, North Carolina.

The machine shops around the country generally are quite busy, and there seems to be a promise that in a few months they will have all they can do to fill orders.

#### The New York Fire Department.

The apparatus of the new paid Fire Department will embrace thirty steam fire-engines and ten hook and ladder trucks. To each steamer there will be attached a tender. Each steamer and hook and ladder truck will be drawn by a powerful team of horses, and the tenders by one horse each, thus employing 120 horses. The tenders will run on four wheels, and will be built somewhat like the hose carriages now in use, only on a larger scale and of stronger build. Each tender will be provided with a reel capable of carrying one thousand feet of hose, and a fuel box calculated for three hours' consumption; in front of the tender will be placed a wide seat for the driver and three men.

These thirty engines and ten trucks will all run below Fifty-ninth street, and the companies will be placed on a regular paid footing, the members being employed constantly on fire-duty, and not allowed to attend to other business. As at present contemplated, this force will comprise 480 men, beside the Board of Engineers. Each engine company will consist of twelve members—a foreman, assistant foreman, engineer, driver, stoker and seven privates. The hook and ladder companies will have the same number of members, but, not requiring an engineer or stoker, the privates will be increased to nine men. The salaries of the department below Fifty-ninth street will be, in round figures, \$363,000 per annum, and will be divided as follows:—

Chief engineer.....	\$3,500
Eight assistant engineers (each \$1,500).....	12,000
Forty foremen (each \$800).....	32,000
Forty assistant foremen (each \$750).....	30,000
Thirty steam engineers (each \$900).....	27,000
Forty drivers (each \$700).....	28,000
Thirty stokers (each \$700).....	21,000
Three hundred privates (each \$700).....	210,000
Total.....	\$363,500

—*Times*.

#### Ventilating Machines and Furnaces.

The methods of ventilating the workings of mines fall primarily into two classes, those in which mechanical agents are employed, and those where heat alone is used for setting up a current. The former class is again divided into machines used for compressing and those for exhausting the air, the latter kind being employed almost to the exclusion of the former. In furnace ventilation, of course, the action is always an exhausting one. In the newly-invented coal-cutting machines, compressed air of from 2½ to 3 atmospheres pressure is employed as the driving power; this may prove a great incidental advantage to the process, as the air escaping from the cylinder will aid the ventilation, and will also serve to cool the workings by the absorption of heat consequent on its expansion. The use of mechanical ventilators is, in England, generally confined to supplying fresh air to a single level, the whole of the workings of a large mine being but rarely dependent upon a machine for a constant cir-

culation; they are, however, more used in the collieries of the north of France and Belgium, where pneumatic engines of considerable size and power are commonly seen. The great ventilating agent employed in English collieries is the underground furnace, which can be made sufficiently large for the requirements of the most extended workings. Permanent furnaces at the top of the upcast pits were formerly employed to a certain extent, but are now rarely seen.

**AIR PUMP OF THE HARZ.**—This contrivance is employed in Cornwall and the German mines for ventilating the ends of levels, and other places where the air is stagnant, by exhaustion, as it is usually of but small size, and requiring little power, it is generally attached to the rod of the pumping engine. It consists of a wooden box of a square section, open below and closed at the top, attached by a wrought-iron rod to a cross arm projecting at right angles from the main pump rod, by which it is moved up and down in an outer case, of similar shape, partly filled with water. A pipe in communication with the level to be ventilated passes up through the bottom of the outer box to within a short distance of the top. It is covered with a plain clack or valve, opening outward; two similar valves are fixed to the top cover of the inner box. As the rod ascends, a partial vacuum is established within the box, as communication with the outer air is prevented by the water-joint, and the top valves are kept closed by the pressure of the external air; the valve on the pipe inside therefore opens, and the air from the workings flows in until the change of stroke, when, by the descent of the box, the air is compressed and opens the two top valves, through which it passes freely into the atmosphere. The same principle has been applied in Belgium to the construction of large ventilating machines for collieries. At Marihay, near Liege, a pair of wrought-iron bells or cylinders are employed, each 144 inches in diameter and about 9 feet stroke; they are suspended by chains over guide-rollers, and are driven by a direct-acting horizontal steam engine. There are 16 suction, and an equal number of exhaust valves, which, owing to the small difference of pressure produced, require to be counterbalanced with weights, in order that they may open and shut freely at the change of stroke. The amount of air drawn by this machine is about 11,500 cubic feet per minute.

**VENTILATING FAN USED IN THE SAXON MINES.**—This fan is of the same kind of construction as that employed for blowing iron-founders' cupolas. It has five radial arms, with flat rectangular blades, which revolve about a horizontal axis within a cylindrical case or drum, having a circular aperture about 20 inches in diameter in the center of each of the sides; the outside diameter of the fan is about 4 feet. The air taken in at the center is discharged through a rectangular tube of 15 inches in breadth and 10 inches in height at the bottom of the drum, and is conveyed through pipes of a similar section, made of wooden planks or sheet zinc, into the forward end of the level to be ventilated. The fan is driven by a wheel 64 inches in diameter, connected by a strap with a spindle of four inches, giving 16 revolutions of the blades for one of the driving wheel. The strap is kept at a proper tension by a friction roller, attached to a board, which slides on a pair of horizontal cross timbers, an arrangement which allows the machine to be put out of work with out stopping the driving wheel or disconnecting the strap in case, where it is only required to be used intermittently. By putting the central apertures in communication with the air tubes the fan can be used for establishing a circulation by exhausting the bad air. By surrounding the fan with spiral guide-plates or diffusers, the air, instead of being discharged at a useless velocity against the walls of the drum, may be led off to the discharge pipes more conveniently and economically. Small ventilators on this principle, constructed by M. Schwamkrug, are now used in the Saxon mines; they have six arms, with blades 8½ inches square and 30 inches in diameter, and can be worked by one man at a maximum speed of from 400 to 450 revolutions per minute, with a pipe of six inches square; 60 cubic feet of air can be drawn in that time from a distance not exceeding a quarter of a mile. The quantity of air required by a man at work in the end of a level is estimated at six cubic feet per minute.—*Mining Journal*.



**Improved Calculator.**

Those who have persons in their employ to whom wages are paid at weekly, semi-monthly or monthly intervals, are often put to considerable inconvenience in making up their pay rolls with sufficient dispatch and accuracy. There is also liability to various errors in the ordinary modes of calculating wages. Calculated tables, which are generally used, having a multiplicity of figures exposed to view, are apt to confuse the eye, and for this reason

second an oyster, which appears to be fricasseed, as it is open and covered with herbs; a third, a rat *farcie*, and a fourth, a small vase filled with fried grasshoppers. Next comes a circle of dishes of fish, interspersed with others of partridges, hares and squirrels which all have their heads placed between their fore feet. Then comes a row of sausages of all forms, supported by one of eggs, oysters and olives, which in its turn is surrounded by a double circle of peaches, cherries, melons and other fruit and vegetables. The

packing will be expanded by the compression of the rubber. In practice the cup leathers are set so as to just fill the pump chamber, so that when the steam comes on the packing it will be forced out by the action of the load on the rubber, as before explained. It is thus easy to see that the friction of the packing is in proportion to the labor on it, if it be properly packed at first.

This mode of packing is well adapted for pumps with untrue barrels—such as old well worn pumps,

**PEALE'S CALCULATOR.**

are not entirely reliable. The book form of tables consumes too much time in finding the various rates of wages, each rate requiring a different page, and has the same disadvantages as the sheet form above-mentioned.

By the use of the instrument herein illustrated the various causes of error heretofore existing, in the making up of pay-rolls, are entirely avoided. It consists of a cylinder, on the surface of which is arranged a calculated table; the left-hand column contains the number of days and fractions of days to be calculated, namely, 1,  $1\frac{1}{2}$ ,  $1\frac{1}{4}$  days, and so on for any number of days, to suit, for weekly, semi-monthly and monthly payments. This cylinder is inclosed in a zinc case, and revolves therein on pins having a bearing in the ends of the case. It is easily moved by a milled head at the left end, and the whole is neatly mounted on a walnut base. Running nearly the entire length of the case is an opening sufficiently wide to expose but one row of figures at a time. Immediately below this opening is placed, on the outside of the case, a row of figures denoting the several rates of wages, from the lowest to the highest ordinarily paid. The operation of this instrument can be readily understood by presenting an example, as follows:—

To find the amount of wages necessary to be paid for  $9\frac{3}{4}$  days at the rate of \$12 75 per week, or \$2  $12\frac{1}{2}$  per day. Turn the cylinder by means of the milled heads at the left end, until the figures  $9\frac{3}{4}$ , on the left-hand column, appear to view; then above the figures \$12 75, denoting the rate of wages, on the outside of the case, will be found \$20 72—which is the amount to be paid.

They are also arranged for calculating by the hour and half hour. This is a very useful contrivance.

For further particulars address C. W. Peale, No. 1,600 Hamilton street, Philadelphia, who will furnish machines at \$6 for weekly, \$8 for semi-monthly, and \$10 for monthly sizes.

**Ancient Luxury.**

The excavations at Pompeii are going on with an activity stimulated by the important discoveries made almost at every step, and the quantities of gold and silver found, which more than suffice to cover the cost of the work. Near the Temple of Juno, of which an account was recently given, has just been brought to light a house no doubt belonging to some millionaire of the time, as the furniture is of ivory, bronze and marble. The couches of the triclinium, or dining room, are especially of extreme richness. The flooring consists of an immense mosaic, well preserved in parts, and of which the center represents a table laid out for a grand dinner. In the middle, on a large dish, may be seen a splendid peacock with its tail spread out, and placed back to back with another bird also of elegant plumage. Around them are arranged lobster, one of which holds a blue egg in its claws; a

walls of the triclinium are covered with fresco paintings of birds, fruits, flowers, game and fish of all kinds, the whole interspersed with drawings which lend a charm to the whole not easy to describe. On a table of rare wood, carved and inlaid with gold, marble, agate and lapis lazuli, were found amphoræ still containing wine, and some goblets of onyx.—*Galignani*.

**ROWE'S PUMP PLUNGER.**

This invention illustrates a simple and certain



method for tightening the cup leathers used in pumps and hydraulic presses for packing. In arrangement it is a bolt, A, and two washers, B. There are two nuts on the bolt, and a rubber packing between the washers, so that as the nut, C, is screwed up, the

and insures the cup leather being used until entirely worn out. It is about to be adopted in the navy, constructor Hanscom having ordered the frigate *Guerrier* to be fitted with pumps having these pistons.

It was patented through the Scientific American Patent Agency on June 6, 1865, by P. C. Rowe, of Boston, Mass.

**Progress of Lock Making.**

In 1832 an English locksmith came to this country, settling at Watertown, Conn., and established himself in company with a resident of that town, in the manufacture of cabinet locks. They improved slightly on the old English make and finish. This experiment proved pecuniarily unsuccessful, and the Englishman sold out to one Terry, who removed the manufactory to Terrysville, and added thereto new men and more money. At that time the markets were stuffed with British goods, and the old English blacksmiths ridiculed the idea of American competition. In 1841, Mr. Terry sold out to Lewis & Gaylord, for six cents on a dollar of the capital stock. This new company progressed slowly, adding new and improved machinery, in its aid. In 1849 Mr. Lewis died, and the Lewis Company was formed by Mr. L.'s heirs taking the principal stock. In the meantime Bucknell, McKee & Co. had started the first trunk-lock manufactory in this country, and sold out in 1854, the companies consolidating into what is now generally known as the Eagle Company. Mr. Gaylord, of the original firm of Lewis & Gaylord, yet continues the lock business as a speciality, at Chicopee, Mass., and has accumulated a handsome fortune by his active industry. He is personally a worker, daily at the forge. For four years past the Gaylord Manufacturing Company has devoted all its labor to the supply of Government contracts for military accouterments. One hundred and ten men are now employed by the company, casting four hundred dozen keys, and making locks in proportion, every day. In March last their income tax amounted to over \$6,000; it averages \$3,000 per month. A new and commodious building is in process of construction for company offices and packing room, and they are just getting underway a steel-pen branch of their business.

**SAVINGS BANKS.**—In the interior towns of Massachusetts, New Bedford stands first, having savings deposits amounting to \$4,554,910. The next is Worcester, \$4,528,505; Lowell, \$3,848,158; Salem, \$3,019,504; Fall River, \$2,963,563; Charlestown, \$2,154,255; Springfield, \$2,076,323; Newburyport, \$1,955,133; Plymouth, \$1,151,353; Haverhill, \$1,061,736; no other place in Massachusetts has savings deposits to the extent of one million of dollars. The largest average to each depositor is in Fall River (\$310), and the smallest is in Plymouth (\$188 to each depositor).





### Force, Power and Work.

[For the Scientific American.]

**FORCE** is a mutual tendency of bodies to attract or repel each other. Its physical constitution is not yet known. We only know its action, which is recognized as pressure and measured by weight. The unit of weight being assumed from the attraction of the earth upon a determined volume of any specific substance; for example, the force of attraction between the earth and 27.7 cubic inches of distilled water, at the temperature of 39.8° Fah., in an atmosphere balancing 30 inches of mercury, at the level of the sea, which is called one pound avoirdupois. Force is the first element of Power and Work, and can be likened to length, which is a primary element in geometry. Force will here be denoted by the letter F, expressed in pounds.

**VELOCITY** is the second element of Power and Work, and may be likened to breadth in geometry. It is that continuous change of position recognized as motion, and is here denoted by the letter V, expressed in feet per second. Velocity is a simple element, although it appears to be dependent on time and space, but the space is divided by the time, and therefore both relieved from the velocity.

**TIME** is the third element of Work, and may be likened to thickness in geometry. It implies a continuous action recognized as duration. Time is here denoted by the letter T, expressed in seconds.

**POWER** is a function of the two first elements—force, F, and velocity, V—as area in geometry is a function of length and breadth. Power is here denoted by  $P=FV$ , which means that the power, P, is the product of the force, F, multiplied by the velocity, V. The power so obtained is expressed in foot-pounds, and called dynamic effect, of which there are 950 in a horse-power; or if the velocity is measured in feet per minute, there will be 33,000 foot-pounds in a horse-power. Power is independent of space and time, but it has often been confounded with work, which essentially depends on time and space.

**SPACE** is a function of the second and third elements—velocity, V, and time, T—and may be likened to a cross section of a solid, which is a function of breadth and thickness. Space is here denoted by  $S=VT$ , which means that the space, S, is the product of the velocity, V, and the time, T, expressed in linear feet.

**WORK** is a function of the three elements—force, F, velocity, V, and time, T. It may be likened to a solid in geometry, which has the three dimensions, length, breadth and thickness. Work is here denoted by  $W=FVT$ , which means that the work, W, is the product obtained by multiplying together the three elements—force, F, velocity, V, and time, T.

Work may also be denoted by  $W=FS$ , or the product of the force, F, multiplied by the space, S, where it appears as if the work was independent of time, but the time is included in the space,  $S=VT$ .

Work may also be denoted by  $W=PT$ , which means the power, P, multiplied by the time, T. Either of the three cases expresses the work in foot-pounds.

Force, velocity and time are simple physical elements.

Power, space and work are functions or products of those elements.

THE SCIENTIFIC AMERICAN is read by most mechanics in this country, and it may be further said that that journal is met with in most parts of the world. It evinces a habitual and sincere desire to furnish its readers with correct and instructive articles on scientific subjects; in consideration of which it would be a neglect of duty on my part to pass over in silence its article on "Work and Power," published on page 71 of the present volume. In that article you say: "The main purpose of Mr. Nystrom seems to be to deny the position that work is independent of time, and he has succeeded in involving the question in considerable confusion." And you think "the facts of the case are simple and plain enough." You proceed to give an antithetical description of what work is, and say: "In this case,

however, we have attached the word *work*, a meaning for which the word *power* is employed by the standard writers on mechanical philosophy." Now you will allow me to remark that, in this expression, you have, together with the standard writers, confounded *work* with *power*. You have thus not followed your own good advice, namely, "to free our minds from confusion" by taking "most important steps to use words always in their exact signification." You then go on to say: "Regarding work as the overcoming of physical resistance, it is plain that the aggregate amount of any given quantity is independent of the time required for its performance." Do you not here convey the idea that *work* is independent of what it requires, namely, the time? You evidently mean to say that a given quantity of work may be performed in any desired length of time; but you do not seem to conceive that the work is dependent on whatever time is required for its completion.

Referring to a geometrical figure, you may be able to comprehend the position of your argument about work, which is substantially this—the *cubic content of a pancake is independent of the thickness required to make it up*! You say: "The question whether it (work) is independent of the time depends entirely upon the meaning of the language employed." To this I respectfully object, inasmuch as I recognize only one meaning in the language I have employed; and, indeed, the entire controversy upon this subject appears to have sprung from a rejection or misappreciation of the specific meaning I have struggled to establish to the terms *force*, *power* and *work*. But supposing, for the sake of argument, that my general language is not sufficiently clear, if you can read my algebraical formulas you will not misunderstand me. Why, therefore, do you not exemplify your argument upon my formulas and thereby show its effect in practice? To say that "work is independent of time," is to say that work is dependent of no time, or that any amount of work may be performed in no time—a proposition which is not yet realized.

Work, as before stated, is the product of the three elements—force, velocity and time. For a given quantity of work, either one or two of these elements can vary *ad libitum*, but only at the expense of the remaining two or one. Work is thus not confined to any specific relation or ratio to either of those elements, but independent of either of them, it ceases to be work.

I am well aware that the standard authors have, to this day, considered work independent of time, and they have also confounded force, power and work with each other, so that we are yet thrown upon our individual authority to decide which is right. Thus, when you and Professor Wood cannot defend your position, it may be very convenient to assert that I use "cant phrases" when I exemplify your arguments, and that "by analogous tricks of language we may confuse our minds in regard to any problem whatever." I nevertheless trust that I have given both perspicuity and precision to my language and meaning in this article, and sincerely hope that it may be tributary to "the consummation—devoutly to be wished for"—of reducing to certainty and system the future reasonings of the scientific world on this subject.

JOHN W. NYSTROM.

### Straightening Gun-barrels.

MESSRS. EDITORS:—Please inform me of the theory of straightening gun-barrels by the process of looking through them at the light.

H. A. M. H.

Philadelphia, Aug. 14, 1865.

[If through a gun-barrel, the bore of which is brightly polished, you look at a sheet of white paper, you will see a series of dark rings, alternating with bright spaces. If the barrel is perfectly straight these rings will be precisely concentric—in other words, the space between any two will be precisely of the same width all round. But the slightest crook in the barrel will cause part of the rings to appear at one side of the center. If the barrel be pointed at a stretched string, the string will be seen across the diameter of the bore, and its reflection will appear at each side crossing the rings. When the barrel is straight the reflected image of the string will form a continuous straight line with the string itself, but any crook will produce a curve in the line of the reflected

image. The rings are caused by interference of light.—Eds.

### New Chuck for Wood or Metal.

MESSRS. EDITORS:—Several kinds of chucks are employed for holding work between two centers; for wood, prong chucks or square hold are the most common; for metal, dogs are usually employed; the disadvantage of the above-named chucks for wood is, that the work frequently gets out of center, when any pressure is used, and it cannot be taken on and off for examination without a risk of missing the center, when replaced.

The disadvantage in using dogs, when turning metal, is the necessity of turning the work end for end, which requires the dogs to be shifted—when you wish to turn a cylinder, for instance, or when you wish to file a cylinder on the lathe; and another nuisance of dogs is, the catching of the tool or fingers against the projecting points of the dogs.

To obviate these inconveniences, I invented a very simple contrivance for holding work between two centers, which is equally applicable to wood or any kind of metal, and the same chuck will hold as firm as a vise a piece of wood or metal half an inch or even twelve inches in diameter. It, moreover, enables the tool of the slide rest, or the hand tool, to pass over the whole length of the work, without turning it end for end; and you can take the work off fifty times and replace it with perfect accuracy.

This chuck is merely a short cylinder of brass or of iron, which screws on to the lathe head with a steel point projecting from the center of the other end, and three steel points at a short distance from this center point, but not projecting quite as far out. These three points are equidistant from each other and from the center point. The projection is about one-quarter of an inch, more or less, according to the nature of the work.

FIG. 1.

FIG. 2.

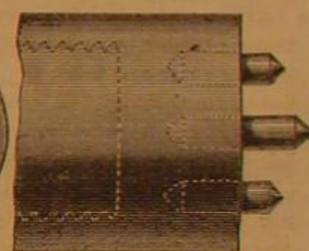
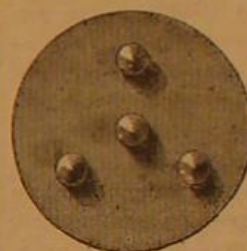


Fig. 1 shows the face of the chuck with four points projecting. Fig. 2 shows a side view of the chuck.

To make this chuck I drill four holes in the face of it, each about half an inch deep, with a drill corresponding with any size of Stubb's steel wire—one of my chucks is drilled to No. 15, another to 22. I then cut off three pieces of Stubb's steel wire of one size smaller than the holes drilled, and point each one on the lathe, and dip the blunt ends into melted tin after dipping them into muriate of zinc. I heat the chuck on a stove, drop into each hole a little muriate of zinc, and then, with a pair of pincers, put in the steel wires, with the points outward; and when cold the chuck is finished. To use it, drill a center hole in each end of the work to be turned, with the same drill employed to make the four holes; put the center point of the chuck into the center hole of the work, give it a tap with a mallet, and you will have three marks, which will enable you to drill the other three holes in the work, with the same drill.

These four points, when inserted into the piece to be turned, and when the other end of the piece is held by the point of the puppet head of the lathe, will keep it as firm as if held by a vise, and it can be taken off and replaced without regard to which of the three outer points is inserted—for if drilled equidistant, all will fit the work.

A bar of metal, in which the four holes have been drilled, can be used up until within one-fourth of an inch of the end, and once the chucks are made and the proper drill at hand, it will be found as easy to mark and drill the four holes in the work as to adjust and screw up a pair of dogs, especially if you have several pieces of metal or hard wood to turn.

I have found—equally with others to whom I have shown my chucks—so much comfort in the use of them, that I freely impart to any mechanic the knowledge how to make this chuck, and the right to use it.

E. J. W.

Lenox, Mass., Aug. 7, 1865.



### Compensation and Loss in the Universe.

(For the Scientific American.)

Nature is a vast system of compensations. Like the tight-rope walker she preserves her equilibrium by perpetual oscillations. Evergreenness and variety bloom everywhere by the endless succession of decay and growth. But, on the whole, in all that is physical, is there a general and progressive exhaustion? Have the compensations and repairs in the physical universe, like those in the human body, no power to prevent a gradual but inevitable decline? Not so, it seems. But, perchance, science is not old enough to see more than the beginning, where life is poised with death.

That the present condition of the material universe cannot continue forever, all the past and the progressive changes of the present plainly attest.

"The constellations seem drawn from the ravished portions of the sky," says a distinguished astronomer. Now and then a planetary aerolite is drawn from its orbit to the earth; much larger numbers must fall upon the inferior planets, perhaps affecting their habitability. Encke's comet slowly approaches the sun, while, according to Meyer, Tyndall and others, solar heat is replenished by a ceaseless storm of lesser planets which fall upon its surface. The earth once aglow has gone out; the brightness of many stars wanes from age to age—the luster of our own sun will pale at last.

Modern science asserts not the persistence of the present order of creation, but the perpetuity, in some form, of the forces working in it. It denies the creation or destruction of force. All the phenomena of vegetable, animal and intellectual life have added nothing to, and taken nothing from, the physical forces of the universe, however they may have affected the moral.

What is force? What is light? What is heat? Vibrations among the atoms of matter, or in intermolecular ether. The atomic theory has greatly enhanced the facility and precision, and, doubtless, the correctness of philosophical discussion. We can as easily apply our reasoning to the atomic structure of bodies as to their visible masses. Force, then, resolves itself into simple impulse of matter, which is as referable to atoms as to sensible bodies.

A certain initial impulse was communicated to matter at first; or from its position and possible changes certain definite degrees of force can arise. Can any part of this impulse be lost? The rays of light may conflict. Those from the same source, turned aside by various media, and reflected by various solids, will collide; for a much stronger reason, the beams from different stars will clash and annihilate each other, striking out here one color and there another, and sometimes all. Could our eyes behold it, under the intenser gush of yellow light plays the endless change of rainbow tints, filling the whole ether with dots and stripes of iridescent hue. Where goes the light thus disappearing? There is as yet no evidence that it is changed to heat. There is no positive proof that such collision does not destroy force. A taper, burning only on the surface of the illuminated tract, gives nearly as much light as a solid cone, because, in the latter case, there would be a collision of rays and a destruction of light. Light is converted into heat when it impinges upon a colored surface, and each especial color, in its disappearance, may assist peculiar chemical changes in the vegetable world. There is yet much to be learned in regard to the temperature of polarizing spars. As yet, no experimental evidence exists of the generation of heat by the direct collision of the waves of light.

One of the latest and ablest advocates of the perfect conservation of forces is Tyndall, who has labored so successfully in the department of heat. He restricts the convertibility to heat and mechanical action, or resistance, making no allowance for the interchangeability of light and heat, or for the generation of any irregular motions, not appearing as any known force.

It seems very improbable that friction, as usually applied, should generate motions so accordant as wholly to avoid collision, or that all collision should simply render the impulse expanded in some other form. It is not probable that the destruction of heat vibrations would produce light, and the experiments of Becquerel seem to prove that heat alone cannot

produce electricity. The experiments from which Prof. Metcalf and others reasoned were, doubtless, faulty. Again, compression produces heat, and stretching, cold. Friction is a union of both—a generation of heat and a destruction of heat; a shaking of the atoms into motion, and a seizing of the atoms to arrest their movement; hence there is an outlay of force that makes no return of heat.

A truer conservation of forces would be the equality of mechanical power, and the sum total of the forces excited. Electricity is as invariably a result of friction as heat.

Why any reluctance to admit the disappearance of force in the realm of nature? There may be a sublimer conservation of forces, which renders them, in some spiritual sense, back to their Author, to be sent forth on a new creative mission. Were they not once created by the Spirit? Are these forces—light, heat, electricity—coexistent with the Deity?

All along the geologic ages miracles of creation were performed; why may not forces be created? These material forces minister to the growth of mind; they render to the spirit world spirit power; what strange if the Spirit again create them anew?

E. S. JEON.

### Duffus's System for Refining Petroleum.

MESSRS. EDITORS:—In the SCIENTIFIC AMERICAN of August 19th you describe the operations of my improved still for the refinement of petroleum oils. As it may be interesting to your readers, I inclose the following statement, which is one out of many similar results of the ordinary distillations that occur during the operation of the still:—

Charge of 100 gallons crude petroleum; gravity, 45° Beaume; temperature, 56 Fahrenheit. The distillation commences when the heat reaches 200°. The gravity of the first run is 76°; temperature, 53°. The following table exhibits the progress of the distillation, the heat being noted by a pyrometer used in the still:—

Heat—Deg.	Temperature.	Gravity.	Gallons Run.
215	52	75	3
236	54	70	2
250	52	67	3
285	52	65	2
315	53	62	3
345	50	61	3
370	51	59	3
385	52	58	3
400	51	57	3
415	52	56	3
425	50	55	3
440	52	54	3
455	51	53	3
485	51	51	3
505	52	50	3
525	52	49	3
560	53	47	3
595	50	46	3
630	52	55	3
650	51	43	3
662	52	44	3
670	49	43	3
(The heat is retained at this point until the operation is completed.)			
	50	43	3
	51	43	3
	50	44	3
	50	43	3
	53	43	3
	52	43	3
	51	43	3
	53	42	3
	54	43	3
	56	43	3
	56	41	3½

Total gallons.....97½

The net result, then, is: water evaporation, 1½ gallons; benzine, 12 gallons; refined oil, 84 gallons; heavy oil, 2½ gallons. The refined oil stands a fire test of 120°.

GEO. H. S. DUFFUS.

New York, Aug. 21, 1865.

### Steam Blast for Iron Furnaces.

MESSRS. EDITORS:—I notice on page 324, Vol. XII., SCIENTIFIC AMERICAN, an article headed "Novelty in Iron Smelting." I was much pleased with it, as I have looked forward to such results—that artificial draught can be procured without the noisy and expensive blast. Since I noticed this article in your

most valuable paper, I partly succeeded in getting a neighbor to try it, offering to bear part of the expense; but for the want of confidence, or not having steam enough, he made a failure of it, and again resorted to the old fan. I was not well at the time. I am now putting up a new cupola, and if I can get such information as to insure success on the subject, will try it thoroughly. Has any one tested the principle in this country? If this plan will not do, where can I get the best fan? We want something better and cheaper than the old fan blast. Who will be the first to invent it? H. P. T.

Memphis, Tenn., Aug. 23, 1865.

[This inquiry relates to a plan which was tried some time since in England, for creating a draught in foundry furnaces by throwing a jet of steam into the chimney. We publish it in the hope that some of our readers may be able to furnish the information desired. If it were necessary to generate steam by a separate fire, it would be an expensive mode of creating a blast, but if the plan of placing the boiler around the chimney and generating steam by the waste heat of the furnace should prove successful, it might be economical as well as convenient.—Eds.]

### Cable—Cockroaches.

MESSRS. EDITORS:—In reading of the breaking of the Atlantic cable it struck me that it might have been recovered by using the three grapnels at once; it was a blind thing to attempt to raise it with one, as the weight increased with the light it was raised. After the first grapnel had raised it a portion, say 600 fathoms, the second should have been attached; and after the two had raised it, say 1,200 fathoms, the third should have been attached; in that manner the three would have been strong enough to raise it to the surface.

A good plan to destroy roaches, without the danger of using poison, is, to fill a basin, or similar vessel, about two-thirds full of water sweetened with molasses, and set it in a corner where they most frequent of a night, and where they can get on the vessel; you will find in the morning as many as the liquid will drown. I have rid my house of them in this way, destroying hundreds in a night.

JAMES JOHNSON.

Washington, Aug. 27, 1865.

### Another Suggestion in Relation to the Cable.

MESSRS. EDITORS:—Upon the score of old acquaintance—having been a constant reader of the SCIENTIFIC AMERICAN since the days of Rufus Porter and his "Air Ship"—I venture to renew a suggestion before made to you.

When preparations were being made for laying the first Atlantic cable, I wrote you that the surest way to lay the cable was from the decks of the *Great Eastern*, through a water-tight compartment, located as nearly as might be in the center of the ship.

In the last failure they made use of the ship, but neglected the most important part of the suggestion, to wit, paying out the cable through the ship's bottom at the center of motion. Here the lateral and vertical motion of the ship is nearly nothing, and the cable would quietly enter the ocean entirely below the influence of waves or winds, and would be protected by the ship itself until it was hundreds of feet below the surface.

I do not propose to try for a patent on this method of laying cables, but feel confident that if it had been made use of in laying the last cable, we should today have been holding telegraphic converse with John Bull.

I do not flatter myself that an obscure Yankee's notions will receive attention, but nevertheless there are very many valuable notions in the world that go no further than the head that conceived them. For my own part I would like to see more of them in your columns, where they may serve the purpose of a "finger board" to point out to some shrewd inventor the road to fame and fortune. J. H. SARGENT. Cleveland, Ohio, Aug. 27, 1865.

### Platinum Crucibles for Glass Melting.

MESSRS. EDITORS:—In a late number of the SCIENTIFIC AMERICAN the following remarks are made by Mr. H. M. Raynor in an article on platinum:—"As a matter of interest to another trade, I may mention the use of platinum crucibles, instead of clay, at the



great glass factory at St. Gobain, France, by M. Pelouze, in order to obtain the purest possible glass, free from the yellow tinge which has been so difficult to banish from clear flint glass." I cannot understand how the substitution of platinum for clay in the crucible will make any difference in the color of the glass. No clay pot that I know of will alter the color of glass; what platinum may do I do not know, but should think that, from continued heat, it would oxidize, and if so, would enter into the glass and color it. The yellow tinge spoken of may be a difficulty at St. Gobain, but is not so here, in the United States; and I am inclined to think that the difficulty M. Pelouze meets with is not from his crucibles (pots), but from his materials. As Mr. Raynor appears to speak by the card, will he tell why amorphous and pulverulent phosphorus is used in place of charcoal? or why charcoal was used? how much each crucible contains in weight of glass? also, the thickness, weight and cost of each material?

If platinum crucibles can be made to stand heat, and fluxes at a reasonable price, and will last, on a guaranty, say four months, a large business can be done, for it is a well-known fact that the success of the business, in nine cases out of ten, depends on the length of time the crucibles stand.

I am much surprised that glass blowers and manufacturers take so little interest in the scientific part of their art. Fewer improvements have been made in the glass business than any art or profession that I know of; indeed, since the invention of the press, I know of no valuable improvement whatever.

The principal reason why matters pertaining to the art are not more publicly discussed, I presume, is the desire to keep the formula secret. This, I believe, is the principal reason why so few real improvements occur. I contend there is no necessity for this secrecy. The possession of ever so many recipes amounts, in the manufacture of glass, to nothing; practice is everything. Even should there be an objection to divulge the proportions used in the "batches," there are many other matters that could be discussed that would be beneficial to the trade, such as the proper size and shape of furnaces; whether the round or square furnace is the most convenient or economical for flint pots; the best material for making furnaces, clay or sand-stone for benches; experience on native clays for furnaces or pots; the proper size for pots; the proper size for eyes; rise of caps, etc., and a host of questions that occur in the trade that would be better for being ventilated and discussed.

There is at this time a desire becoming general to introduce gas as fuel in the furnaces. I know that much money has been expended to solve the question of its practicability. It is reported to be in use in Pittsburgh, Pennsylvania; it is known to have been used in England, but with what success I cannot learn. Information on this subject, gas, and any other pertaining to the business, given in a plain manner, dispensing with the use of scientific terms when it can be done, would be beneficial to the artist and manufacturer; and I have no doubt the SCIENTIFIC AMERICAN would afford room in its valuable columns for the information.

F. H. S.

Milville, N. J., Aug. 21, 1865.

[We shall be glad to give our glass-making friends a hearing.—EDS.]

#### Gunpowder—Jupiter's Moons.

MESSRS. EDITORS:—On page 36, SCIENTIFIC AMERICAN, Mr. F. G. Fowler writes that the theory of the conversion of heat into motion does not account for the force developed from one pound of powder applied to an eight pound ball. To show that the whole force due to the combustion of the two ounces of carbon is not applied to the ball, three points are to be noticed: First, the combustion is very imperfect, the volume of smoke being so much carbon not consumed; second, the capacity for heat of the iron of the gun is so great that it would absorb a great part of the heat of the carbon without raising the heat of the gun very much; third, one-half the force obtained is expended in giving motion to the gun. Could these results be measured they would probably account for the force not utilized in moving the ball.

Can any of your readers explain the following phenomenon?—If Jupiter be reflected in a looking-glass two apparent moons are seen. If the glass be turned

one-quarter round, in the same plane as before, these moons appear at right angles to their first position. They are not seen when the planet is reflected in quicksilver, nor are they in the true position of Jupiter's moons. No other planet or star gives a similar reflection in a looking-glass.

T. McD.

Newburgh, July 17, 1865.

[The smoke resulting from the combustion of gunpowder is different from that produced by burning wood or coal. Gunpowder is made of sulphur, charcoal and saltpeter—saltpeter, nitrate of potash, being composed of nitrogen, oxygen, and the metal potassium. In burning, the saltpeter is decomposed, its oxygen combining with the carbon of the charcoal to form carbonic acid; the sulphur and potassium uniting to form sulphide of potassium, and the nitrogen being set free.  $KO, NO_3 + S + 3C = KS + 3CO_2 + N$ . These are the theoretical reactions in case of perfect combustion; in practice the products are numerous, and vary with the conditions under which the powder is burned; but whenever sulphide of potassium is produced, that, being a solid, will form a portion of the smoke. To calculate the force of gunpowder *a priori*, even in case of perfect combustion, is a very complex problem, as the heat consumed in the chemical decompositions, as well as that generated by the combinations, must be taken into account. The specific heat of iron is 0.1138, only one-ninth that of water.

Prof. Treadwell contends that much more of the force of the powder is expended upon the ball than upon the gun, as the same pressure acts on both, but acts on the ball through a greater space.

Before any of our readers attempt to explain the question in relation to Jupiter's moons, we respectfully suggest that they try the experiment, and see whether there is any truth in the statement. Jupiter is now visible in the evening—being the brightest star in the southern sky, and the experiment may be easily tried.—EDS.]

#### Another Plan for Perpetual Motion.

MESSRS. EDITORS:—Being aware that you do not believe in the realization of perpetual motion, because action and reaction work with equal power in different directions, and a body put in motion by a power will cease as soon as said power is exhausted, which is true, permit me, however, to advance the opinion that it may be accomplished on the principle of attraction and repulsion, by which all the celestial objects receive perpetual motion. For instance, let two wheels be attached by gearing, to move in different directions, but make equal revolutions—the lower primary wheel supplied with a metallic ball, and the upper secondary wheel semi-attractive and repulsive, so that the attractive part will be in conjunction with the ball on its ascent, and the repulsive part on its descent. There is no power needed to put said machine in motion, as the attraction of the earth will cause the ball to descend, and momentum in addition with the upper attraction to ascend, and when beyond its meridian the repulsive part will again let the earth perform its natural law.

J. L. JURGENS, of the Isle of Tohr, Denmark.

Washington, August, 1865.

[We receive a good many perpetual motion schemes which we throw into the waste basket, but there occasionally comes one of a little more intricacy than the average which we are induced to publish, as many persons like the exercise of unraveling the fallacy.—EDS.]

#### The Fool and His Money.

The lucky miner hastens down to Victoria or San Francisco, and sows his gold broadcast. No luxury is too costly for him, no extravagance too great for the magnitude of his ideas. His love of display leads him into a thousand follies, and he proclaims his disregard for money by numberless eccentricities. One man who, at the end of the season, found himself possessed of \$30,000 or \$40,000, having filled his pocket with twenty dollar gold pieces, on his arrival in Victoria proceeded to a "bar-room," and treated "the crowd" to champagne. The company present being unable to consume all the bar-keeper's stock, assistance was obtained from without, and the passers by compelled to come in. Still the supply held out, and not another "drink" could any one swallow. In this emergency the ingenious giver of

the treat ordered every glass belonging to the establishment to be brought out and filled. Then, raising his stick, with one fell swoop he knocked the army of glasses off the counter. One hamper of champagne, however, yet remained, and, determined not to be beaten, he ordered it to be opened and placed upon the floor, and jumping in, stamped the bottles to pieces with his heavy boots, severely cutting his shins, it is said, in the operation. But although the champagne was at last finished, he had a handful of gold pieces to dispose of, and walking up to a large mirror, worth several hundred dollars, which adorned one end of the room, dashed a shower of heavy coins against it, and shivered it to pieces. The hero of this story returned to the mines in the following spring without a cent, and was working as a common laborer at the time of our visit. A freak of one of the most successful Californians may be appended as a companion to the story just related. When in the height of his glory, he was in the habit of substituting champagne bottles—full ones, too—for the wooden pins in the bowling alley, smashing batch after batch with infinite satisfaction to himself, amid the applause of his companions and the "bar-keeper."—*The Northwest Passage by Land.* By Viscount Milton and Dr. W. B. Cheadle.

#### Detection of Fire-damp.

A very ingenious and simple instrument has been invented by Mr. Ansell, of the British Mint. Its action depends on that tendency which exists in gases and vapors passing themselves through each other, notwithstanding the interposition of membranes and porous substances, which is called *exosmose* and *endosmose*, and it consists of a small brass cylinder, one inch and a half long and three-quarters of an inch in diameter within, and of a piston working freely in this. Under the piston, and within the cylinder, is a spring, which, when pressed by the sinking of the piston into the cylinder, moves a hand on a dial on the outer case, the back of which is of thick porous earthenware, and its appearance somewhat resembles an aneroid barometer. When this instrument is brought into an atmosphere containing coal gas, the latter passes through the porous plate with a velocity dependent on its amount; and the air within the case being expanded, the piston is forced into the cylinder to an extent which is indicated on the dial. Taken out of impure air, the effect will be reversed, and the index will move on the dial in the opposite direction, the amount of purity or contamination being exactly indicated. It is clear that the instrument might easily be made to set a bell ringing, or give some other notice of danger from the presence of an explosive atmosphere. So far as trials of it have been made, it seems to work satisfactorily.

#### Rapid Sawing.

MESSRS. JACKSON, CARRIER & CO., of Pittsburgh, own a saw mill at Brookville that does wonderful work. The sawyer cut in twelve hours, one day recently, 44,325 feet of good marketable boards. The machinery of this extraordinary mill was manufactured in Brookville. The engine is a sixty-horse power, weighing three tons, with a fourteen-inch cylinder, resting on a cast-iron bed-frame. Length of stroke twenty inches, with a ten-foot driving wheel, upon which, on this occasion, but two-thirds of the maximum power of the engine was used, causing it to perform one hundred and fifty revolutions per minute, driving the saw at the rate of seven hundred and fifty revolutions per minute. The fuel consisted entirely of green sawdust, and not over one-third of the dust that fell from the saw was used in the furnace. As a general thing, a log that would cut three hundred feet of boards, was put on the carriage, sawed, and the lumber put off the mill in five minutes.—*Boston Commercial Bulletin.*

MAGNESIAN PIPES.—Meerschbaum is made on a large scale in New York, says the *Boston Advertiser*, by saturating carbonate of magnesia in silicate of soda or soluble glass—care in selecting a good quality of magnesia being the only requisite for success. The profits are immense, as will be seen. Magnesia costs about twenty-five cents per pound; silicate of soda even less. A pipe made of the "foam of the sea," as smokers verily believe, costs for material about five cents, leaving the balance for labor.



**Improved Hose and Pipe Coupling.**

The ordinary coupling which is used to connect lengths of hose and water pipe is very unsatisfactory sometimes, by reason of the threads getting jammed on the end, so that they cannot be entered; or sand or grit sticking between them, so that they bind when half way in, and cannot be moved either way. The coupling is also tedious to attach, for the female screw often binds in the neck where it turns, so that the whole length of hose has to be twisted in order to take it apart or connect it.

The device here shown is a very simple and efficient one for the purpose. There is no screw whatever, and the joint is formed by a cam. This is shown in Fig. 2. In this view, A is the male joint, and B the female. On the first-named there is a small lug, C, projecting, which fits a recess, D; see Fig. 1 also. On the opposite joint there is a cam, E, working in a

the size can be made so that the same pair of sandals will serve for different members of a family.

The utility of this invention, to those who have use for it, appears at once. It was patented through the Scientific American Patent Agency on March 28, 1865, by Edward Fitzki, whom address for further information at No. 271 Pennsylvania avenue, Washington, D. C.

**A Novel Locomotive.**

Mr. E. N. Dickerson has lately adapted his boiler

out some exceedingly fine work. They propose to build a new boiler shop at an early day.

**A Remarkable Coin.**

Mr. C. R. Brown, a jeweler at Saratoga Springs, has a very remarkable gold coin, about the size of a half eagle, for which he has been offered \$1,200. He values it at the modest sum of \$2,000. It is a remarkably fresh-looking coin, but is no doubt a genuine one of the time stated by the Rev. W. W. Eddy, missionary in Assyria, who thus describes how

Fig. 1

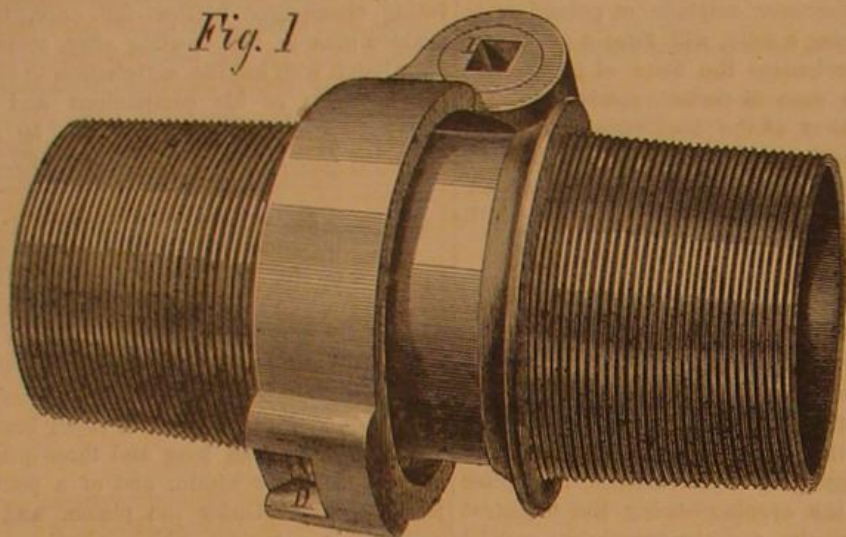
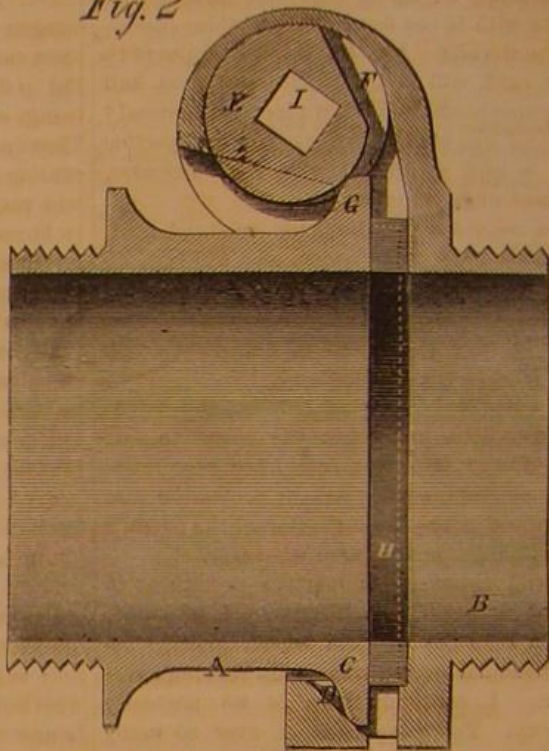


Fig. 2

**BARNARD'S HOSE AND PIPE COUPLING.**

chamber, F. When this is turned down the body bears on the shoulder, G, and presses it hard down on the leather joint, H, below, making a strong connection and a perfect water-tight joint. By turning the cam up so that the straight side is in line with the opening, the two joints can be separated. All that is necessary is to insert one part within the other, turn the cam down with a key fitted to the square orifice, I, Fig. 1, and the joint is made. The entire patent, city or State rights for sale.

This is a very useful coupling, and was patented through the Scientific American Patent Agency, on June 5, 1865, by A. E. Barnard; for further information address him at the C. C. Forge, Cleveland, Ohio.

**Improved Ice Sandal.**

Those who walk on slippery places know how uncertain the footing is; and many a one who strolled along in thoughtless security, has found to his sorrow that ice is treacherous, and that sleety sidewalks, or paths full of snow hummocks, betray the unwary feet.

This ice sandal is intended to make walking on ice as easy and safe as walking on gravel, and it will do the thing perfectly. In detail, it is a sandal made of sheet metal, and shaped to the foot. It is jointed and rebated in the middle, as at A, so as to be capable of extension without dislocation; a spring, B, serving to keep the two pieces together. In the bottom of this sandal there are holes through which steel points, C, project, in shape like the fleam used for bleeding horses. These points penetrate the ice and prevent the feet from slipping, as before spoken of. At the heel, or back of the sandal, there is a knob, D, fastened to the shaft the steel points are on.

By moving this knob through the slot, I, the points can be thrown entirely clear of the ice, so that the sandal can be immediately converted into a plain ordinary surface when the same is needed for walking on the ground. By extending the sole a variation in

to a locomotive engine with cylinders of unusual size and stroke.

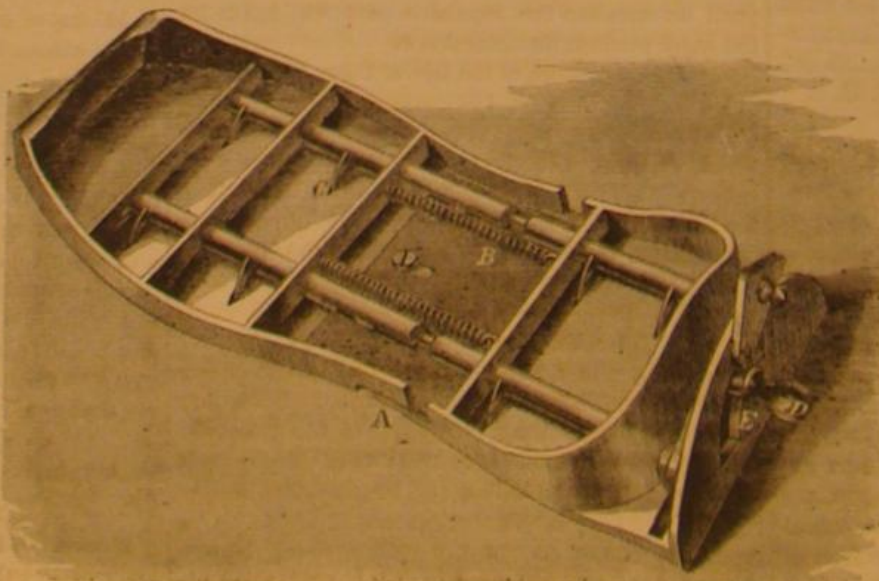
The following particulars are derived from the *World*:—

The Providence Steam Engine Company are building for the Erie Railway a new locomotive, with Dickerson's boiler, which is a novel piece of workmanship and arrangement. The engine driver is placed forward of the boiler, directly over the spot where the smoke chimney of the engines now in use is placed. The fireman will retain his station behind the boiler. The boiler, being of an entirely different form from those in use at the present time, will enable the locomotive water tank and coal box to be in one continuous frame, so that there will be no tender. The cylinders will be twenty inches in diameter, with twenty-six inches stroke of piston. The valve motion and cut-off will be on a new plan. Great things are expected of this new arrangement,

he became possessed of it. Mr. Brown informs us that persons interested in numismatics often come great distances to see his wonderful coin:—

"A coin of Phillip II. of Macedon, father of Alexander the Great, who reigned about 340 years before Christ, and consequently is 2,200 years old, was found in the garden adjoining Sidon, Syria, among the ruins of the ancient city. Two jars containing coins of Phillip and Alexander were found in the ground by workmen digging, and the contents divided among them. The Turkish Government claim all such treasures, and, hearing of the discovery, imprisoned the workmen until they gave up nearly all the coins. These they immediately melted up for new coinage. A Mohammedan woman who was with the workmen obtained some of the coins, and wearied out the Government by her endurance of imprisonment, while denying the possession of any of the treasures. After her release, I obtained this coin with much difficulty from her, through her fear of another arrest."

"W. W. EDDY,  
"Missionary in Assyria."

**FITZKI'S ICE SANDAL.**

and certainly in these days of railroad accidents it seems right and proper that the engine driver should be so placed as to receive the first fruits of his negligence. This Company are also engaged in building a number of portable engines. This shop is one of the best arranged in the country, and turns

minute. The bayonet it is to have will be the sword bayonet, the same as now used by the Chasseurs à Pied and the Zouaves.

A MAN in England walked 8 miles in 68 minutes and 40 seconds.

**BREECH-LOADERS FOR THE FRENCH INFANTRY.**—The Paris correspondent of the London *Daily News*, writing from the camp at Chalons, says:—"I have just seen the new breech-loading rifle which has been decided upon as the future fire-arm of the French infantry. It is an admirable weapon. The bore is about the same as our Enfield. The breech is opened by the most simple method and I should say was next to impossible to get out of order. The barrel is pulled away as it were from the person who holds it, and pulled back in an instant. It can be loaded and fired with the greatest ease—from 31 to 33 shots in a



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## OUR CIRCULATION.

We have had no doubt, for a long time, that the circulation of the SCIENTIFIC AMERICAN was far in advance of that of any other paper of its class, either in this country or in Europe; and some information that we have recently received in regard to the numbers printed of the leading publications abroad, has led us to the conclusion that the circulation of this paper surpasses that of all the other mechanic and scientific periodicals of the world combined.

## EARTH CURRENTS AND THE ATLANTIC CABLE.

If a piece of insulated wire is bent in a coil, and a current of electricity is passed through it, the axis of the coil becomes a magnet and continues so as long as the current is flowing. From this fact it has been supposed that the magnetism of the earth is induced by currents of electricity passing around the globe, this current being excited by the heat of the sun as the earth rotates beneath it.

In the year 1840 a series of very delicate observations on the variations in the magnetism of the earth were commenced at Girard College, Philadelphia, and the results have been the subject of elaborate discussion by Professor Bache in several papers that have been published by the Smithsonian Institution as a part of its contributions. We recently published Professor Bache's conclusions in regard to the more regular variations in the earth's magnetism—those which occur daily and those of the eleven-year period—corresponding with the recurrence of spots on the sun. Beside these, the observations discovered occasional variations of great irregularity and violence, which have been called magnetic storms. It seems that such a storm was prevailing at the time the signals became unintelligible on board the *Great Eastern*, and may have been the only cause of the signals failing. If this was so, the cable was cut, without any necessity, when in perfect condition.

The registering apparatus employed to record variations of magnetism is the most delicate of any instrument known to either mechanic arts or scientific observation. The force is so small that the needle must be suspended to traverse with the greatest possible ease; a pencil rubbing against paper would hold it fast. A thin silver mirror is mounted upon the needle, and upon this is thrown a beam of light which is reflected upon a strip of photographic paper, the apparatus being placed in a dark room where no light other than the reflected beam can reach the

paper. The paper is slowly unrolled from one roller and wound upon another by clock-work, the spot of light printing a continuous line as the paper is drawn along. For horizontal variations the paper has, of course, a vertical motion, and for the vertical dip a horizontal motion—the variations giving a zig-zag form to the line.

The English papers publish the following letter, in relation to the recent magnetic storm, from Professor Airy, the Astronomer Royal:—

"ROYAL OBSERVATORY, }  
"Greenwich, Aug. 5—12 M. }

"DEAR SIR:—At the date of my letter yesterday the magnetic storm had somewhat subsided. Very soon, however, there were signs of great activity, and by 11 o'clock of last night (Friday, August 4th), the magnetic storm was sensibly as violent as before, and continued so through all the early morning hours. It has declined a little through the morning, but at the present time (Saturday, August 5, at noon) it is still very active.

"The spontaneous earth currents were not quite so strong in the last twenty-four hours (ending Saturday, August 5, at noon) as in the preceding twenty-four hours (ending Friday, August 4, at noon), but they are still very active. A nearly continuous register is made by the currents on the Dartford wire (which at first were not very strong) to midnight of Friday, August 4; but since that time the traces have been lost, and the currents on the Croydon wire have been very violent; only for a short time, ending about Friday, August 4, at 3 P. M., was the motion sufficiently gentle to have left any record, and then imperfectly. After that time the currents were so violent that the trace is totally lost.

"It is scarce in possibility that a telegraph current can have passed along the Atlantic cable in a legible state during any part of this time. "G. B. AIRY.  
"G. SAWARD, Esq."

## NYSTROM ON WORK AND POWER.

We have a kindly feeling toward Mr. Nystrom, having received from him several valuable contributions. It has seemed to us, however, that his method of explaining the difference between work and power was calculated rather to confuse than to elucidate the subject. In reply, he forwards us a communication containing his explanation, with a request that we would lay it before our readers and let them judge for themselves. We comply with his request with pleasure, and the communication will be found on another page.

The raising of 1 pound of matter 1 foot in vertical height is 1 foot-pound of "work." The raising of 33,000 pounds 1 foot is 33,000 foot-pounds of work, whether 1 minute or 100 years be consumed in the operation.

The power—either of a steam engine, waterfall or animal—that can raise 33,000 pounds 1 foot in each minute of time is 1-horse power; the power that can raise 33,000 pounds in half a minute is 2-horse power; and the power that can raise 33,000 pounds in one-tenth of each minute is 10-horse power.

Morin and other writers, therefore, say that the idea of work is independent of time, but that time is an element in the measure of power. It seems to us that these writers are correct. It seems to us, also, that the matter is extremely plain and simple.

Mr. Nystrom, on the other hand—while accepting, if we understand him, the above illustrations of both work and power—denies that work is independent of time, or that time is an element of power, and asserts that the subject is not generally understood, even by educated engineers. We have criticised his arguments upon it as calculated rather to confuse than elucidate it; from this criticism he wishes to appeal to the judgment of our readers—an appeal in which we cheerfully concur.

## THE WAY TO PREVENT RAILROAD ACCIDENTS.

There is only one chief cause of railroad accidents, that is—carelessness. There are railroads in the country that have been in operation many years, and that never have had an accident. Can there be any doubt about the reason for this exemption? It is due to one thing, and one only—thorough and energetic care on the part of the managers. The properties of iron, wood and steam are constant; the uni-

verse is governed by fixed laws; the same care in the management of other roads would result in the same safety.

The manifest means for securing this thorough care in the management of all roads are to make it for the interest of managers to be careful. The principal cause of carelessness is a desire to save money. Incompetent superintendents are hired at low salaries; repairs are postponed or imperfectly performed, and risks of accidents are encountered rather than the expense to prevent them.

Now, our railroad directors are not usually men who delight in useless slaughter, like Champ Ferguson or Captain Wirz. If it were just as cheap, they would usually prefer to carry their passengers through in safety, rather than to tumble them down an embankment or pitch them into a river.

The plain remedy, then, is to make it cheaper for railroad directors to run their trains with safety than it is to run them with the recklessness that now prevails. Let every accident cost the company so much that it will be for their interest to avoid it. Let juries exact heavy damages in all cases of death or injury.

In order that this may be done in the State of New York, a change in the law is necessary. The revised statutes limit the damages that may be recovered in case of actual death by the carelessness of railroad managers to \$5,000. If a lawyer, doctor or broker, with an income of \$10,000, is suddenly killed by the carelessness of some opulent railroad company, the widow is offered the pittance of \$300 a year. There is not a mechanic in the country who cannot earn two, three or four times this sum. As a first step toward railroad reform let us have a repeal of this absurd law.

## TYNDALL AND THE CLIMATE OF CALIFORNIA.

The interior of California is occupied by a great valley, lying between the coast range of mountains and the Sierra Nevada, being some 60 miles in width, from east to west, and 300 in length, from north to south. The climate of this valley is very peculiar; like the rest of California, it has no rain during the summer, but, unlike the coast district, the days are excessively hot, while the nights are remarkably cool. For months together the thermometer ranges in the afternoon from 100° to 109° in the shade, but after about 5 o'clock, it begins to grow cool, and the temperature continues to fall till sunrise. A bowl of butter at sunset will be liquid oil, and at sunrise as hard as if it were imbedded in ice. Another noticeable feature of the climate is the extreme dryness of the atmosphere; lumber is seasoned with wonderful rapidity, and clothes washed and hung upon a line are completely dried in a few minutes.

In a nice laboratory in England a philosopher is engaged in some very abstruse investigations of the nature and action of heat. His apparatus is of wonderful delicacy—his thermometer being so sensitive that the approach of the human hand within three feet of it will vary its indications. With this delicate apparatus, with large knowledge, and with patient labor, the eminent physicist has prosecuted his examination of the subtle and invisible force which was the subject of his investigations. Among other facts, he learned that while heat passes freely through atmospheric air, its course is seriously obstructed by minute quantities of the vapor of water.

What a miracle is civilization! Sitting in our office in New York, by the aid of books and mails, we are able to glance in one direction across the stormy ocean to the laboratory of the philosopher, and in the other across the broad continent to the parched valley of the Sacramento, and to perceive an interesting relation between the two. The discoveries of Tyndall have taught us why it is that the dryness of the California atmosphere causes the days to be hot and the nights cool. The absence of aqueous vapor from the air allows the sun's rays to pour down with undiminished force during the day, and during the night the same cause permits the radiation of heat from the earth to go on with greater rapidity than in the moister air of other climes.

Colt's factory is to be run twenty hours a day, in consequence of the increased demand for pistols. Many of the orders, it is said, come from Southern negroes.



## THE EXPLOSION OF THE "ARROW'S" BOILERS.

After a long and tedious examination of many witnesses, upon the cause of the recent explosion of the steamboat *Arrow*, the facts so far elicited show that it was the result of carelessness. The boilers were built in 1858, and had been run constantly since then, with but ordinary intermission. It is testified that the material was poor when new. There were two boilers and one safety valve, and a stop valve between the two, so that unless the stop valve was opened the boiler had no insurance against explosion. To open this valve, or to see it opened, was the engineer's duty, and if he neglected it he jeopardized the lives of all on board.

It is given in evidence by Mr. Edward Start, of Jersey City, who was formerly the engineer in charge of this boiler, that if the valve was down there would be no way for the steam to escape but by exploding the boiler. Capt. Charles B. Spencer, formerly an engineer, testified that, in his opinion, the boiler exploded from the carelessness of the engineer; that is, in not opening the stop valve aforesaid. It is easy to make mistakes in commenting upon the evidence of witnesses, but, from the statements of these experts, the cause of the disaster is no mystery, and could have been inferred beforehand.

We have not the slightest respect for the evidence of those who predict all sorts of catastrophes from the hour a boat is launched; we put more faith in the testimony of competent witnesses, and from these it appears that the cause was a neglect of duty—called carelessness—on the part of the engineer.

If any easy-minded person thinks the steamboat *Arrow* is the only one in this condition he is deluded. Of the steamers that ply about this harbor there are numbers unfit to steam an hour, but which do run and carry passengers in an unsafe condition. There are boilers with shells patched; with water bottoms covered all over with soft patches; with flues corroded thin about the flanges. At the hand-hole plates, and at the back of the furnace under the bridge walls, the metal is so thin that one cannot screw up a plate without danger of pulling it through, and yet they run and will continue to do so.

Investigations of explosions serve to show the public what the officers in charge knew long before, and accidents will continue to occur, and lives will yet be sacrificed on the altar of cupidity and carelessness. In the case of these boilers, they were not safe in any event if the engineer forgot to open the stop valve, and the malconstruction was, in reality, the prime cause of the explosion. It is but lately that a set of boilers were demolished in Second avenue from this very cause—a stop valve between two boilers and a safety valve on one boiler only. How many more are there in this condition?

The verdict of the jury, rendered since the above article was written, is:—"We severely censure the owners of the boat for running her with old and imperfect boilers, and also criminally censure the Government Inspectors for the careless manner in which they inspected said boilers, and for giving a certificate for the use of the same."

A righteous verdict.

## MARKET FOR THE MONTH.

The country is enjoying a season of unparalleled prosperity. The cotton manufacturers are selling their goods for cash at 100 per cent profit, just as fast as they are made. Not more than half of the machinery is running, however, in consequence of the scarcity of labor, and wages have materially advanced—some girls making two dollars a day at weaving. Under the stimulus of these liberal rates the villages are rapidly filling up, and the amount of machinery in operation is constantly increasing. Dry-goods commission merchants are selling nearly all their goods to arrive for cash; jobbers select their customers and sell either for cash or on thirty days time; in straw goods the trade is being done on the sidewalk—the goods being bought before their arrival and distributed without entering the store; porcelain manufacturers tell us that their ware is ordered ahead of the manufacture; the newspapers were never making so much money before; and, in short, it seems to be a period of general prosperity. There is only one drawback—a nervous anxiety to know

what Mr. McCulloch is going to do in reference to the currency.

We give below our usual table, showing the changes in the prices of the leading staples since the beginning of the month.

	Price Aug. 2.	Price Aug. 30.
Coal (Anth.) 2,000 lb. ....	\$ 8 50	\$9 50 @ 10 50
Coffee (Java) 25 lb. ....	25 @ 28	26 @ 26 1/2
Copper (Am. Ingot) 25 lb. ....	30 @ 31	30 1/2 @ 32
Cotton (middling) 25 lb. ....	48	44
Flour (State) 25 bbl. ....	\$5 00 @ 7 00	\$6 80 @ 9 25
Wheat 25 bush. ....	1 85 @ 2 30	2 10 @ 2 40
Hay 100 lb. ....	1 00	60 @ 70
Hemp (Am. drs'd) 25 lb. ....	255 00 @ 265 00	270 00 @ 300 00
Hides (city slaughter) 25 lb. ....	9 @ 10	10 @ 10 1/2
India-rubber 25 lb. ....	48 @ 70	47 1/2 @ 70
Lead (Am.) 100 lb. ....	9 00 @ 9 62 1/2	9 25 @ 9 30
Nails 100 lb. ....	6 50	5 50 @ 6 00
Petroleum (crude) 25 gal. ....	32 1/2 @ 33	32
Beef (mess) 25 bbl. ....	\$10 00 @ 14 50	8 00 @ 14 50
Saltpeter 25 lb. ....	24	22
Steel (Am. cast) 25 lb. ....	13 @ 22	13 @ 22
Sugar (brown) 25 lb. ....	8 @ 16 1/2	11 @ 16 1/2
Wool (American Saxony fleece) 25 lb. ....	75 @ 77	75 @ 77
Zinc 25 lb. ....	12 1/2 @ 13 1/2	13 1/2 @ 13 1/2
Gold. ....	1 45 1/2	1 44
Interest (loans on call). ....	4 @ 5	4 @ 4

## 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:—

*Device for Reeling Cord.*—This invention relates more particularly to an arrangement of mechanical devices to be applied to the handle portion of a fishing pole, either upon its inside or outside, for reeling the line, and consists principally in imparting to the spool or reel upon which the line is wound a reciprocating rectilinear movement, while at the same time it is revolved, whereby the line can be evenly wound, and with dispatch and facility. The operating devices for the spool are also so arranged that, when desired to unreel the line, they can be thrown out of gear, as it were, with the spool, leaving it independent of them, and free to revolve on its axis or shaft. The arrangement of this reeling device is simple and ingenious in many respects, and its operation quite free and accurate; and, for the purpose for which it is especially intended, it possesses many important advantages over the ordinary reeling devices now in common use for fishing poles. William M. Stuart, of New Jersey, is the inventor.

*Fire Alarm.*—This invention relates to an apparatus the operation of which is based upon the expansion and contraction of a spring composed of two different metals or other materials. The outer end of this spring is connected to an elbow lever, which is secured to a vertical arbor bearing an index, which traverses over an adjustable scale, and when the temperature rises beyond the desired point, said index, by coming in contact with the end of a lever, releases a tilting weight, and, by the action of this tilting weight, another similar weight is released, and thereby the escapement of a clock movement is freed, and said movement being driven by a weight or spring, causes a hammer to strike repeated and rapid blows on a bell, so that the attention of persons in the room, building or other structure is called to the fact that the temperature has reached its maximum. The scale and spring are situated on a common bed-plate, and by adjusting this bed-plate the point, when the alarm is released, can be adjusted at pleasure. Charles Dion, Montreal, Canada, is the inventor.

## The Latest Yankee Experiment in Naval Architecture.

In a few weeks more another eccentric ship, even for this most eccentric ship-building age, will be afloat upon the Thames. We have jointed ships, unsinkable ships, ships of seven inches of iron, and the *Great Eastern*. Now, again, we are promised another addition to the motley fleet, and yet another improvement, in the launch of the cigar ship.

The vessel is of wrought iron, and is being built as the private yacht of an American gentleman—Mr. Winans—who, as we have said, has designed everything connected with the ship. The execution was at first entrusted to Mr. Hepworth, and he expended upon it the most perfect workmanship of which wrought iron is capable. The hull, as the hull of a ship, looks one of the most extraordinary things it is possible to imagine. It is immensely long, perfectly round, resembling the shape of a cigar, being, how-

ever, finely pointed at both ends, instead of, as in a cigar, only one. The form is so at variance with all our generally received notions of nautical beauty that we can only stare at it in mute astonishment, though there is something in its long, tapering lines so suggestive of immense speed that one is almost ashamed that no one ever suggested such an idea before. In justice, however, to our own time, it must be said that such a vessel could only be built at a period when iron ships were in use and iron ship-building had reached its highest state of development. Looking at her now, she appears to be little more than a gigantic iron mainyard for some vessel of the *Great Eastern* class, having a rather wide diameter in the middle, and tapered at each end to a point almost as fine as that of a needle. Her boilers, like all the other parts of the vessel, are on a new plan. Four of them are on the locomotive principle, with vertical tubes. A blast fan is to give them draught, and they are to work at one hundred and fifty pounds pressure. This is a great power, but, as the boilers are built far stronger than even locomotive boilers, it is asserted that they could be worked up to one thousand pounds, or even one thousand one hundred pounds per square inch, with safety. There are one hundred and thirty-six feet of fine bar surface, and it is expected that, with the aid of the blast fan, each of these one hundred and thirty-six feet can be made to burn fifty pounds of coal per hour. If the furnaces can accomplish this, then, according to the rule which gives one nominal horse power for every two and a half pounds of coal consumed per hour, Mr. Winans's yacht will be working at nearly two thousand five hundred horse power. In our best mail steamships, on their fastest trips, it is found difficult to burn thirty pounds of coal per foot of fire bar surface per hour. If Mr. Winans, then, burn fifty pounds, he will be working up to nearly two thousand five hundred horse power, or at the rate of eight indicated horse power to every ton burden of his vessel. In very fast ocean-going steamers the ratio of horse power to tonnage is only about two and a half tons to one nominal horse power. The advantage which the cigar ship possesses in this respect, together with those which her slender form, smooth surface and very small midship section (only one hundred feet) will give, should enable her to go at an extraordinary speed. It is said that, as regards motion at sea, rolling and pitching will be reduced to a minimum, and certainly her form seems to suggest that such a result will very probably be effected. With very small masts, and all her weights well below the water line, she is not likely to roll. But if she does not pitch, but cuts through the water, she will "take it in over all," and in that case, with her upper deck so near the sea, we should fancy that it would be swept fore and aft. The extreme length of the vessel over all is two hundred and fifty-six feet, and her greatest width and depth is, of course, amidships, where the circle is sixteen feet diameter. Thus, then, her length is no less than sixteen times that of her greatest width, ordinary vessels being thought very narrow if their width is only one-seventh of their length.—*London Times*.

[This is the second cigar-shaped vessel built by the Messrs. Winans; the first was constructed in Baltimore, in 1858, and was illustrated on page 65, Vol. XIV. (old series) *SCIENTIFIC AMERICAN*. We there gave our reasons, at great length, for the opinion that it would not succeed, and we have seen nothing since to change our opinion. If the vessel were designed to be wholly submerged, the model would be excellent, but as it is to float upon the surface, the model of the submerged portion is about as poor as can be conceived.—Eds.]

*PIT HOLE AND ITS NAME.*—Pit Hole, an oil well in Pennsylvania, was thus named in consequence of an extraordinary pit or cavern that exists about three miles from the city. In this pit stones are thrown, but they are never heard drop. Its depth has not as yet been fathomed. The whole country between there and Plumer is believed to be cavernous.

*LEVEL OF THE DEAD SEA.*—An expedition sent out from England last September, under Captain Wilson, R. E., claims to have settled the question accurately, and reports that the Dead Sea, in the time of flood, is 1,289 1/2 feet, and in summer 1,298 feet, lower than the Mediterranean.



## MISCELLANEOUS SUMMARY.

New carriages of a luxurious kind are about to be placed on the Nicholas Railway between St. Petersburg and Moscow. In addition to a handsomely furnished saloon and smoking chamber, each carriage comprises a series of smaller apartments opening on both sides of a corridor. The sofas, ottomans and cushions of the daytime are at night converted into beds, mattresses, pillows, etc., so that the passengers can sleep with all the comforts of home. These improvements are not confined to the first-class carriages, but are extended to those of the second and third class. Our railway directors and managers would do well to follow this example. Of course, a slight additional charge is made to passengers using these conveniences.

**FRENCH SILKS.**—The French silk manufacturers have suffered severely from the American war. The silk exports to the United States, in 1860, from France were 103 millions. In 1863 it fell to 23 millions. During this interval of three-years the exports from France to the United States fell from 250 millions to 94; and North American produce imports into France for French consumption suffered to the same extent. Instead of 240 millions in 1860, which, owing to the rise in the price of cotton, reached 363 millions in 1861, it fell in 1863, to 81. This reduction applies especially to raw cotton.

**THE Wisconsin State Agricultural Society** will hold its twelfth annual exhibition at Camp Tredway, in the city of Janesville, from September 25 to 29, 1865. The programme includes first-class trials of speed of trotting, pacing and running horses; superior trials of machinery; equestrianism; evening discussions of practical questions by the ablest men in the West; presentation of the prize banner to the county that shall make the best exhibition at the State Fair; and annual addresses by Major-General W. T. Sherman, Hon. H. S. Randall, LL.D., of New York, and other distinguished speakers.

The railway over Mont Cenis is to be worked, as is pretty well known, by means of a third rail, on which the driving wheels of the engine will run horizontally. The credit of the invention is assumed by the engineer of the line, Baron Sequ'ni. Mr. Vignoles, the English engineer, now steps forward to claim it as the infraction of a patent obtained by himself and Capt. Ericsson in 1830-31. The authenticity of the claim is avouched by Sir Charles Fox, who incloses Mr. Vignoles's letter to the *Times*.

The following statement gives an idea of the cost of keeping Paris clean:—The sweeping of the macadamized roads costs £33,680 a year; the cleaning of the paved ways £91,000, of which £3,120 goes for materials, £20,400 for carting away the dirt, and the rest in paying the sweepers, who consist of women as well as men. The expenses of management and superintendence are £10,400. Total expenditure, £135,080—\$675,000.

**A PEPPERMINT PLANTATION.**—At Ada and Lyons, Mich., Mr. Van Auken is extensively engaged in growing peppermint for distillation. He has nearly two hundred acres growing in the two counties. This is an easily-grown and highly remunerative product, giving four crops from one planting of roots. The one hundred acres devoted to this crop, last year, gave a net profit of \$5,000.

**MANUFACTORY OF LUBRICATING OILS.**—The firm of Morehouse, Merriam & Co., of Cleveland, Ohio, manufacturers of compound lubricating oils, now turn out from their factory from four to five thousand gallons a day, and have capacity, if pressed with orders, to produce double that amount. They give employment to about fifty hands. Large quantities of these oils are shipped to Boston.

The borers through Mont Cenis have come across a stratum of quartz that tests the power of machinery and compressed air to the utmost. Not more than a meter a day can be worked, and the stratum is four hundred meters in thickness, which will considerably increase the time necessary to finish the road.

The Union Copper Mine, at Copperopolis, during the month of June, shipped from the mine to San Francisco, via Stockton, the large amount of three thousand six hundred tons of ore, the freight money on which was \$29,000.



## Patent Claims

ISSUED FROM THE UNITED STATES PATENT-OFFICE

FOR THE WEEK ENDING AUGUST 29, 1865.

Reported Officially for the Scientific American.

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

**49,600.—Carpet Fastening.**—G. W. Andrews and J. P. Burnham, Chicago, Ill.:

We claim, as a new article of manufacture, the carpet fastening, B, made by bending a single piece of wire, with eyes, a, a, hooks, b, b, and a bracing stay, c, in the manner herein described.

**49,601.—Corn Planter.**—G. J. Bergen, Galesburg, Ill.:

First, I claim the plate, B, provided with the ears, a, a, and lugs, b, b, as and for the purpose set forth.

Second, I claim securing the hopper, A, by means of the hinge joint at its front, and brace, d, constructed and operating substantially as and for the purpose set forth.

Third, I claim the seed slide, C, provided with the inclined flat groove, o, as herein shown and described.

Fourth, I claim making the post, E, with the detachable piece, h, as and for the purpose set forth.

**49,602.—Liquid Ejector.**—Abel Brear, Saugatuck, Conn.:

I claim the ejector, consisting of a single curved or bent tube, A, having an unobstructed passage, and external nozzle, a, for the admission of steam or other aeriform fluid, communicating with the said passage on its back or outer curved side, at a point directly opposite to, and in line with, the outlet or discharge opening, b, substantially as and for the purpose herein specified.

**49,603.—Water Ejector.**—N. S. Chappell, New York City:

I claim the movable or reversible shaft, F, having an attached nozzle, G, or outlet, in combination with an ejector, substantially as and for the purpose herein specified.

**49,604.—Building for Preserving Milk, Fruit, Etc.**—N. W. Clark, Detroit, Mich.:

I claim the arrangement and construction of the building, with its apparatus, E, G, H, U and W, as herein described and for the purposes set forth.

Second, I also claim the arrangement of the devices, R, N, S, W and U, so as to be operated in the one apartment, J, without affecting the temperature of the adjoining apartment, D.

Third, I also claim the mode of preserving the ice, and saving all the drippings, by conveying the cold water from the melting ice by means of pipes through a series of rooms to one or more reservoirs or tanks.

Fourth, I claim the shape and construction of the faucet, U, arranged and combined with the head, W, and valve, T, as herein described and for the purposes set forth.

Fifth, I also claim keeping the sawdust undisturbed by means of tubes, P, P, P, in the partition walls, so that the crank, N, handle, S, and faucet, U, may be opened or removed without opening the apartment, D.

**49,605.—Tent Frame.**—Wm. H. Clark, Cincinnati, Ohio:

I claim the combination of the shaft, G, with the hinged legs, A, sleeve, C, and rods, J, when constructed and applied as herein described, so that in the extended condition of the frame the said shaft will extend above the frame for the attachment of guys.

**49,606.—Machine for Scouring Leather.**—W. M. Clarke, Butternuts, N. Y.:

First, I claim the frame, A, as constructed, in combination with the rotary table, B, carriages, C and D, substantially in the manner and for the purpose set forth.

Second, The carriages, B and C, operating substantially in the manner and for the purpose set forth.

Third, The ropes, R, pulleys, F, and crank shaft, N, operating the carriages, substantially in the manner and for the purpose set forth.

Fourth, The rotary table, D, in combination with the carriages, substantially in the manner and for the purpose set forth.

Fifth, The rubber arm, E, whiffletree, H, lever, F, connecting rod, G, spring, L, and friction roller, T, with connecting rod attached, the whole combined and operating substantially in the manner and for the purpose herein set forth.

**49,607.—Harvester.**—Wm. Cogswell, Ottawa, Ill.:

I claim the flanged gudgeon, which is adjustably supported on the reel post, and sustains the reel with an extended bearing longitudinally, substantially as described.

**49,608.—Harvester.**—Wm. Cogswell, Ottawa, Ill.:

First, I claim attaching the cutter bar, and through it the platform, to the frame by the pivotal connection and draught rod, at diagonally opposite corners of the frame, as represented, so that by the breaking or detaching of the latter the platform wheels around and tows behind.

Second, The method of connecting the bridge piece, L, to the frame by means of a pillar pivoted in holders, N, O, and the box, P, which is adjustable vertically on said pillar, substantially as and for the purpose described.

Third, The cap piece, T, in its three-fold character, as a portion of the journal bearing the circle for the lever and the holder, for the upper end of the pillar, M, substantially as herein set forth.

**49,609.—Machine for Making Sheep Labels.**—C. H. Dana, West Lebanon, N. H.:

I claim a machine for making labels for sheep, in which the several operations of numbering, lettering, cutting-off and bending the metal strip, are performed by means of dies, cutting-forms and jaws constructed and operating substantially as described.

I also claim the wheels, d, d, d, in connection with the pawl, e, for numbering the metal strip, constructed and operating substantially as described.

**49,610.—Rotary Engine.**—Seth M. Davis, Rushville, Mo.:

I claim two pistons, F, F, in combination with the steam pipes, n, n, and the steam ports, e, e, e, of the steam chest, D, when constructed as described and set forth.

**49,611.—Carriage Top.**—L. Z. Dodds and Robert Walsh, Three Rivers, Mich.:

First, We claim the combination of the top with the seat of the carriage, in the manner described, for the purpose set forth.

Second, Fastening the top to the seat of the carriage, substantially in the manner described, for the purpose set forth.

Third, The skeleton frame, constructed as described, for the purpose set forth.

**49,612.—Apparatus for Mounting and Printing Photographic Cards.**—G. W. Doty, Lockport, N. Y.:

First, I claim the mounting and printing photographic cards at one continuous operation, as and by the means substantially as described.

Second, I claim the construction and arrangement of the sections, B and C, joined or hinged together, in combination with the plate, D, or its equivalent, as and for the purpose set forth.

Third, I claim the printing silk, H, type, c, and cap, H', arranged and operating in combination with the sections, B and C, or their equivalents, as and for the purpose set forth.

**49,613.—Lamp.**—John P. Driver, Marengo, Iowa:

First, I claim the base, E, F, G, H, made hollow and air tight as a reservoir.

Second, The supply pipe, I, J, for the double purpose of letting the oil into the reservoir, and also of transmitting it to the lamp fountain, A, B, C, D.

Third, I claim the thumb bellows, P, Q, R, S, of india-rubber with the aperture, P, the slit, S, elastic flap, V, with a spiral spring to strengthen said flap, in place or not, as may be best, and the air chamber, N, O, as set forth.

Fourth, I claim the hollow handle, L, K, H, to answer the double purpose of a handle and air pipe, to transmit the air from the bellows to the reservoir. In lieu of said thumb bellows an ordinary short india-rubber tube, with a mouthpiece, may be used to force the air into the reservoir.

Fifth, I claim the combination of the fountain, A, B, C, D, the reservoir, E, F, G, H, the supply pipe, I, J, the elastic indiarubber ball, P, Q, R, with the aperture, P, the slit, S, and the valve, V, the air chamber, N, O, with a spiral spring to hold said valve in its place, or other equivalents; the air pipe, L, K, H, connecting with the reservoir, E, F, G, H, the support, D, M, the whole arranged and operating substantially as herein specified.

**49,614.—Anti-friction Wheels for Belt Gearing.**—David Eldridge, Philadelphia, Pa. Antedated Aug. 13, 1865:

I claim the arrangement of an anti-friction wheel or wheels between the driving and driven pulleys, or between the journals of their shafts, so that the periphery of the wheel or wheels shall have a continuous rolling motion on the peripheries of the said pulleys or journals, as the case may be, substantially in the manner described and for the purpose set forth.

**49,615.—Gate.**—S. L. Fisher, Brimfield, Ill.:

I claim the construction of the wind paddle, A, forming the top of the gate, and projecting beyond the end of the gate, in combination with the ropes, C, when arranged and combined as herein described and for the purposes set forth.

**49,616.—Punch.**—M. J. Fitzpatrick and Benjamin Barker, New York City:

We claim, First, The bands surrounding the worm screw shaft, and connected to the eccentric box in the combination, as and for the purpose specified.

Second, We claim the combination of the worm screw and wheel, the flattened main screw, the eccentric and main stock, substantially as and for the purpose set forth.

**49,617.—Inkstand.**—B. S. Fletcher, Cornish, N. H.:

I claim the combination of the bottle, C, the spring, D, and the guard, F, all arranged in the case, A, substantially as described and for the purpose set forth.

**49,618.—Converting Reciprocating into Rotary Motion.**—J. F. Foss, Lowell, Mass. Antedated Aug. 28, 1865:

I claim the construction of the sliding frame, C, C, the combination, arrangement and operation of the said frame, C, C, and the crank, D, D, with the shaft, L, substantially as herein specified and for the purpose herein set forth.

**49,619.—Damper for Stovepipes.**—Joseph Fowler, Watertown, Wis.:

I claim, First, A series of divided disks, hinged, and formed alternately of larger and smaller sizes, the larger disks having openings near their centers, the whole forming a damper, as set forth.

Second, I claim the triangular flanges, o, o, in combination with the hinged half disks, for the purposes and as specified.

Third, I claim the cam pieces, i, i, on the damper rod, h, in combination with divided hinged damper disks, for the purposes and as specified.

**49,620.—Newspaper File.**—Jacob Frick, Philadelphia, Pa.:

I claim, First, The strips, A and B, combined with the plates, C and C', and with the springs, a, or their equivalent, substantially as and for the purpose specified.

Second, The plates, A and B, one having a projection on its edge and the other a recess in the edge adjacent to the said projection, for the purpose specified.

Third, The strips, A and B, having strips of cloth, rubber or other elastic material secured to their inner edges, for the purpose specified.

**49,621.—Horse Hay-fork.**—D. M. Garrett, Shelby, Ohio:

I claim the arms, A' and B', curved laterally, as shown and described, for the purpose of dispensing with the wooden heads, in combination with wheel, b, hook, J, link, F, and lever, L, when said parts are connected and arranged as herein shown and described.

**49,622.—Fire Screen.**—H. P. Gengembre, Pittsburgh, Pa.:

I claim the sliding screen or screens, S, S, the slotted arm, T, and disk, H, the whole arranged and operating as and for the purpose specified.

**49,623.—Steam Gage Cock.**—Victor Giroud, New York City:

I claim the arrangement of the way, a', as herein described, in relation to the way, a, in the plug of the cock, for the purpose herein set forth.

**49,624.—Globe Oil Cup.**—Victor Giroud, New York City:

I claim the plug, D, with ways or ports, I, J, K, L and M, in combination with the inner shell, C, with ways, F, G, H, and I, the globe, A, and receiver, B, the whole arranged and operating substantially in the manner herein described, for the purposes set forth.

**49,625.—Cylinders of Wool-burring and Similar Machines.**—C. L. Goddard, New York City:

I claim the manner of constructing the inner cylinder of burring machines of metal strips and wood combined, on a metal shaft, substantially as and for the purpose specified.

**49,626.—Grain Dryer.**—Robert Heneage, Buffalo, N. Y.:

I claim the arrangement of the perforated discs, C, provided with the cones, C', and secured serially upon the shaft, B, with the conical perforated hoppers, D, for the purpose of distributing the grain to and from the centre of the machine, the several parts being constructed in the manner specified.

**49,627.—Button-hole Sewing Machine.**—D. W. G. Humphrey, Chelsea, Mass.:

I claim the feeding gage, in combination with the ratchet band or pawl, and the feeding ring which operates the clamp that holds the cloth, substantially as and for the purpose specified.

I also claim the adjustable cam plate which regulates the range of feeding motion for spacing the stitching in working the eyelet, in combination with the ratchet band or pawl, and the feeding ring which operates the clamp that carries the cloth, substantially as and for the purpose specified.

I also claim the adjustable cam plate which regulates the range of feeding motion for spacing the stitches along the straight parts of the button-hole, in combination with the ratchet band or pawl, the feeding ring and the adjustable cam plate for adjusting the range of the feeding motion in working the eyelet, substantially as and for the purpose specified.

I also claim the auxiliary spring which acts on the ratchet band or pawl only at the time it is required to act on the ratchet teeth, in combination with the ratchet band or pawl, the feeding ring and the feeding gage, substantially as and for the purpose specified.

I also claim connecting the loop carrier and the under thread carrier with each other to be operated together, and by the same means, substantially as and for the purpose specified.

I also claim uniting two loop openers for opening the loop of the needle thread and the loop of the under thread, substantially as described, so that they shall be operated by the same means, as described.

And I also claim each of the loop openers, in combination with each of the oblique sides of the aperture in the plate below that part of the table on which the stitching is effected, substantially as and for the purpose specified.

**49,628.—Extractor of Tubes, Drills, Etc., from Oil Wells.**—William R. Hinsdale, Brooklyn, N. Y.:

I claim the cylinder, A, to which the bar, B, is attached at one side, so as to afford no obstruction to the passage of the rod to be raised, through the said cylinder to any desired extent, and which is constructed sharp edged at the lower end, as described, in combination with the spring, C, the top of which is nearly on a level with the top of the said cylinder, for the purpose specified, all arranged in the manner herein set forth.

**49,629.—Flour Bolt.**—James E. Huston, Hillsdale, Mich.:

I claim, First, The barrier, F, consisting of the parallel wires stretched between the ribs of the boiler frame, substantially as described.



scribed, and interposed between the inlet aperture for the chop and the bolting surface on the ribbed frame.

Second, In combination with the said carrier I claim the knocking device, as described.

49,630.—Cattle Tie.—James Ives, Mount Carmel, Conn.: I claim, First, Providing for shortening the snap, or closing tongue of a snap hook, by applying the spring, which operates to keep the tongue in place against the end of the hook, in rear of the pivot connection of said tongue, substantially as described.

Second, Adapting the rear extension of the lever tongue, D, to receive and retain in place a spring which is located in rear of the fulcrum of said tongue, substantially as described.

Third, Constructing the fastening rings, E E', and applying them to the halter rope, substantially as described.

49,631.—Cheese Curd Cutter.—Hiram Keeney, Potter Centre, N. Y.: I claim, First, The vat, A, Figs. 1, 2 and 3, in combination with the racks, B B, pinions, C C, and rollers, D D.

Second, I claim so arranging the racks, B B, pinions, C C, and rollers, D D, in combination with shaft, E, and crank, G, as to give the knives, F F, a revolving motion from the bottom of the vat upward, through the curd, always in the direction of the advance motion of the shaft E, when turned by crank, G.

Third, I claim the revolving knives for the purpose of cutting curds in the process of making cheese, substantially as and for the purpose set forth.

49,632.—Window Shutter.—William H. Kennard, Jr., Baltimore, Md.: I claim the shutter provided with a hinged panel, as herein described, as an article of manufacture.

49,633.—Joint for Lightning Rods.—L. King, East, Cleveland, Ohio: I claim the connection of branch pipes or rods by means of the pin, g, head, c, and collar, f, with the dowel, d, or their equivalents, substantially as described.

49,634.—Curtain Knob.—Calvin Z. Kroh, Tiffin, Ohio: I claim the new article of manufacture, as herein described, consisting of the screw, e, flange, d, square or angular enlargement, c, neck, b, and head, a, all united together for the purpose set forth.

49,635.—Wash-board.—John S. Lash, Philadelphia, Pa.: I claim, in combination with a series of rollers of the form herein described, and arranged in relation to each other as set forth, a rubbing board having longitudinal and transverse grooves in or on its face, and acting with said rollers, as herein described and represented.

49,636.—Device for Holding Sheep while being Sheared.—Miles K. and Lyman P. Lewis, Iowa City, Iowa: We claim a revolving seat, made concave or otherwise, for the purpose of holding and turning sheep while they are being shorn of their wool.

And in combination with the above-claimed seat, we claim a back or rack, made arched, curved, or otherwise, to support the sheep on its rump, and provided with a device to hold said rack, more or less inclined, or otherwise.

We also claim mounting said seat and rack on a rotating platform, so that it may be turned by the shearer to adapt it to the air, light, or other circumstances.

49,637.—Process for Treating Ore.—Simon F. Mackie, New York City: I claim the within-described mode of obtaining a rich gold residue from ores of gold, by treating the ores by roasting and fusing, and subjecting the roast to the action of acids, substantially as described.

Also, Removing the base metals and other matters from the roasted matter, and leaving a rich gold residue, by subjecting the roasted matter to the action of acids, substantially as described.

49,638.—Bolt Machine.—Aaron Marcellus, Rockport, Ill.: I claim the combination of a pair of double-recessed dies, one or both of which vibrate with a reciprocating die working between them, and with tongs, constructed substantially as described, and arranged and operating substantially as and for the purpose set forth.

49,639.—Book Stand or Holder.—William W. Marston, New York City: First, I claim the socket, f, in combination with the arm, b, set on a gudgeon, and with the standard, b, the parts being constructed and employed substantially as specified.

Second, I claim the segment, i, in combination with the arm, b, and standard, b, substantially as and for the purposes specified.

49,640.—Pump.—Reuben A. McCauley, Baltimore, Md.: First, I claim the compound adjustable piston, G, constructed and operating substantially as described, for the purpose set forth.

Second, The combination with piston, G, of sliding valve, V.

Third, The nut, N, on the lower end of the piston, G, constructed substantially as described, and arranged in relation to and operating to unscrew and lift the valve seat, X, and the reverse.

Fourth, The ring, r, as arranged in relation to the valve seat, and the piston and its rod, substantially as shown and described.

Fifth, The basket handle, b', of the valve seat, X, having a slot, s, in the same, for the purpose set forth.

49,641.—Cider Mill.—W. E. McDowell and Charles M. Baechtel, Hagerstown, Md.: I claim the above-described arrangement of screw cone, provided with notches in the thread of the screw, and with the spikes, f, in combination with the box, E, and teeth, c, substantially in the manner and for the purposes set forth.

49,642.—Spading Machine.—William R. Mears, Grafton, Ill.: First, I claim the combination of a series of pivoted revolving spade shafts or rollers, b, and attached spades, d, with a pair of supporting wheels, g, g', when the journals of said rollers, b, are confined in fixed and stationary bearings formed in said wheels, substantially in the manner and for the purpose herein set forth.

Second, I claim also, in combination with the spade shafts or rollers, b, rocking in stationary bearings, as described, the outer segmental levers, c, c, cam, B, and guide plate, p, all arranged and operating substantially in the manner and for the purpose herein set forth.

Third, I claim the combination of a series of spades, d, d, with a bent axle, D, and the supporting wheels, g, g', substantially in the manner and for the purpose herein described.

49,643.—Mode of Securing Bobbins in Shuttles.—Stephen C. Mendenhall, Richmond, Ind.: I claim the bobbins having its head constructed as described, in combination with the wire or rod, C, in the shuttle, all as and for the purpose set forth.

49,644.—Loom.—Stephen C. Mendenhall, Richmond, Ind.: First, I claim the described arrangement for securing the reed in the lay, consisting of the relate in the latter and the adjustable strip by which the face of the reed is fitted against the edge of the shuttle race.

Second, I claim the combination of the ratchet wheel, Y, the pawls, v' v'', and the springs, w, as and for the purpose described.

Third, I claim the guide plate, x, on the under side of the shuttle boxes, and forming a support for the strap, y, when it is brought into action to thrust back the picker block to its place.

Fourth, I claim the combination of the cam, h, the pivoted up-rights, j, and the treadles, f, as and for the purpose described.

49,645.—Artificial Leg.—Anton Mennel, New York City: First, I claim the stop, b, in the ankle joint, produced by an extension of the artificial tibia, and applied substantially as and for the purpose set forth.

Second, The arrangement of the pin, m, situated below and somewhat in front of the fulcrum pin, l, of the knee joint, in combination with the spring, j, substantially as and for the purpose described.

49,646.—Churn.—August A. Newman, Sparta, Ill.: I claim the arrangement for the securing of the rock shaft, D, by means of the pillow block, l, the movable cap, m, secured by the latch, n, each and all operating in the manner and for the purposes herein set forth.

49,647.—Wall Builder and Stump Extractor.—George W. Packer, Jr., Mystic River, Conn.: First, I claim the within-described combination and arrangement of the pyramidal frame, M M', and curved reaches, E E', with the four wheels and their accessories, substantially as and for the purposes set forth.

Second, I claim the employment of braces P1 P2, or their equivalents, in combination with the struts, M, etc., and the curved reaches, P', etc., and arranged to be supported on wheels, substantially in the manner described, so that the braces shall aid in maintaining the curvature or arching condition of the reaches by connecting each to the struts above at one or more points, as and for the purpose herein set forth.

Third, I claim the spherical-based rocker, G, having the king bolt, D, connected thereto by a loose joint, as represented, in combination with a trussed frame, M, etc., and with the wheels, substantially as for the purposes herein set forth.

49,648.—Railroad Car.—William Partridge, Philadelphia, Pa.: First, I claim a hinged fender or guard, when the same is kept in position by a spring, substantially as and for the purposes set forth.

Second, The combination of the supplemental frame with the hinged fender or guard, substantially as and for the purpose set forth.

49,649.—Manufacture of Hoes.—Andrew Patterson, Birmingham, Pa.: I claim as my invention the improvement in the manufacture of hoes herein described: that is to say, forming the eye and the blade of one sheet of metal previously rolled to the thickness of the intended blade, the eye being formed by the gradual action of a series of dies so operating on the substance of the said sheet of metal as to compress into the body of the eye a greater quantity of metal than previously lay within its circumference, the complete hoe being thus formed without further forging, substantially as described and set forth.

49,650.—Combined Strainer and Spout.—William Polyblank, Cleveland, Ohio: I claim the special arrangement of the movable cylinder strainer, C, with the spout or outlet, D, connected to B, Fig. 2, by the screw, E A, the receiving spout being soldered to the vessel, Fig. 2, when operating conjointly as and for the purpose set forth.

49,651.—Securing Linchpins.—Caleb M. Risley, Woodbury, N. J.: I claim the washer, in combination with the sliding spring and slotted ears, C C, all constructed and arranged as described, substantially as and for the purpose set forth.

49,652.—Heater.—Eli C. Robinson, Troy, N. Y. Antedated August 18, 1865: I claim the annular-formed air-supplying apparatus, B, or its equivalent device, constructed and arranged substantially as hereinbefore described, in combination with the fire or combustion chamber of stoves, in the manner substantially as and for the purpose as herein set forth.

49,653.—Nail Machine.—Jacob Russell, Brooklyn, N. Y.: First, I claim the combination, in a machine for cutting and heading nails, of a pair of cutters having an oscillating motion about an axis perpendicular, or nearly so, with their cutting-edges, a direct forward-feeding device and a pair of reciprocating headers, the whole operating substantially as herein specified.

Second, Two or more pairs of jaws attached to one revolving shaft of a nail-cutting and heading machine, when constructed, arranged and operating, substantially as and for the purpose herein specified.

Third, The revolving and reciprocating headers, applied and operating in combination with the revolving clamps and oscillating cutters, substantially as herein described.

49,654.—Scrap Hook.—Cyrus W. Saladee, Newark, Ohio: First, I claim the open skeleton frame, A1 A1 A A A, when constructed and operating in the manner and for the purpose shown and described.

Second, I claim spreading the point of the hood, B, so as to form the projecting corners, or their equivalents, X X, in the manner and for the purpose substantially as shown and described.

Third, I claim the indentation, H, or its equivalent, on the bottom side of the point of the hook, B, in combination with the curved end of the spring, S, in the manner and for the purpose substantially as shown and described.

Fourth, I claim the hook, E, on the end of the spring, D, constructed and operating in the manner and for the purpose substantially as described.

Fifth, I claim the slot or hole, F, through the body of the snap, in the manner and for the purpose substantially as shown and described.

Sixth, I claim the shoulders, K and K', or their equivalents, when arranged in combination with the flattened front of the hook, B, and projecting corners, X X, in the manner and for the purpose substantially as shown and described.

49,655.—Snap Hook.—C. W. Saladee, Newark, Ohio: First, I claim the guard plate, A, when secured to the rear end of the snap, B, and protecting the spring, S, in the manner and for the purpose substantially as shown and described.

Second, I claim riveting the spring, S, to the under side of the guard plate, A, in the manner and for the purposes substantially as shown and described.

49,656.—Door Fastener.—G. W. Sayre, Piquette, Ohio: I claim the within-described implement as an article of manufacture.

49,657.—Horseshoe Nail Machine.—H. F. Sehnders, Buffalo, N. Y.: First, I claim the combination of the triple hammers, C C D, the two first having a simultaneous stroke against each other, and the latter an alternate stroke against the fixed die, H, arranged and operating substantially as set forth.

Second, I also claim the double-beaked cams, b, in combination with the jointed arms, f, f, and pressure springs, n, n, for actuating the hammers, substantially as set forth.

Third, I also claim the combination of the tripple hammers, C C D, springs, E E E, cams, b, with gear shafts, G G G, chisel, J, and eccentric, l, all arranged and operating substantially as and for the purposes described.

Fourth, I also claim, in combination with the tripple hammers, C C D, and the actuating parts therewith, connected to the forge, R, for heating the rod for each successive nail, arranged substantially as set forth.

Fifth, I also claim the springs, o, o, and feeding cam, m, on the shaft, so arranged as to hold the nail rod in position while the nail is being wrought, and to feed it forward to the hammers as each nail is finished, substantially as set forth.

49,658.—Process for Treating Ores.—Henry B. Slidel, Wilmington, Del.: I claim combining cast-iron turnings, or other cast-iron scrap of sufficiently small size with wrought-iron scrap or turnings to form an aggregated mass, to be formed into bloom by the hammers.

49,659.—Friction Match Composition.—N. B. Shaw and David Shaw, Sanbornton, N. H.: We claim the new or improved liquid match composition, made of the materials substantially as described.

49,660.—Adjustable Window Stop.—William Shaw, Hudson, N. Y.: I claim the box or thimble, with the elongated opening or slot, B, inserted into the stop or bead, and through which slot, B, the screw, A, passes into the jamb, whereby the said bead or stop is made adjustable relatively to the sash, in order to maintain the requisite fit or tightness, as described.

49,661.—Combined Seed-planter and Cultivator.—Paul Sinnhold, St. Louis, Mo.: First, I claim the combination and arrangement of the wheel, A, with the handles, f, f, and with the draft cords, h, h, the same forming two triangles, whose apexes are in the axis of A, and by the application of power at their bases, f f h h, acting to preserve the correct equilibrium of the entire machine.

Second, I claim the adjustable central joints or bearings of the beams, C C, in combination with a supporting axle, B, or its equivalent, all being constructed and arranged to operate substantially as and for the purposes set forth.

Third, I claim the arrangement and combination of the draft attachments, comprising the adjustable ring nuts, g', adjustable eye bolts, i, i, or their equivalents, and the cords, rods or chains, h, h, substantially as and for the purposes herein set forth and specified.

49,662.—Boiler Furnace.—Peter Smith, New York City: I claim the arrangement of the regulating valve, C, in connection with the air-distributor, B, to open by gravitation, and to be closed by a lever, e, and chain, d, or its equivalent, substantially as herein specified.

49,663.—Fishing-line Reel.—Wm. M. Stuart, Newark, N. J.: First, I claim the arrangement of the mechanical devices herein described for winding a line upon a suitable reel or spool, operating

together substantially in the manner and for the purposes set forth.

Second, Connecting and disconnecting the reel from its driving shaft by means of a frame, t2, so constructed and arranged in combination with the spring, k2, on the reel, as to interlock the catch, g2, or withdraw it from the shaft slot, l, substantially as described and for the purpose specified.

Third, Passing the line or cord through the center of the fishing pole to the reel or spool, for the purpose described.

49,664.—Apparatus for Cooling Sirup, Etc.—F. W. Tilton, Bristol Station, Ill.: First, I claim the annular vessel, G, supported in the tank, B, at a little distance from the bottom, and arranged relatively to the receiving pipe, b, and to the discharging pipe, C, substantially in the manner and for the purposes herein set forth.

Second, I claim the combination of the annular vessel, G, the tank, B, cold-water induction, b, and eduction, C, with the sirup reservoir, A, and pipes, I and J, and suitable controlling means, i, j, substantially as herein specified.

49,665.—Lantern.—Augustus Tufts, Malden, Mass.: I claim the construction of a lantern, substantially as and for the purpose specified.

49,666.—Steam Cock.—Albert Tyler and G. F. Kendall, Fitchburg, Mass.: First, We claim the arrangement of the prismatic chamber, k, within the key, C, above the chamber, n, with the head, l, projecting from the valve stem, substantially upon the principle and in the manner hereinbefore set forth.

Second, We also claim the combination of the passage, v, with the chamber, n, and the chamber, k, arranged as described.

49,667.—Cultivator.—H. H. Webster, Claremont, N. H.: First, I claim the shafts, A, chains, C and D, and cultivator, B, combined and arranged substantially as described and for the purposes specified.

Second, The spring, m, lever, n, and slotted standard, L, when used for the purpose herein set forth, substantially as described.

49,668.—Railroad Switch.—William Wharton, Jr., Philadelphia, Pa.: I claim the combination of the permanent rails, A and A', of the main track, the rails, B and B', of the turn-out, the movable switch rail, D, and the guide rail, G, the whole being arranged and operating substantially as and for the purpose herein set forth.

49,669.—Automatic Rake for Harvesters.—William N. Whiteley, Jr., Springfield, Ohio: I claim, First, The plate, W, and lever, Z, or an equivalent device, for raising the rake away from the platform without affecting the weight of the wings of the reel to prevent the removal of the gavel when desired.

Second, The combination and arrangement of the reel shaft, I, plate, W, flanges, K K, and cam rail, S, for the purpose of revolving, guiding and controlling the action of the combined rake and reel, substantially as set forth and described.

Third, In combination with the staves of an upright revolving reel, substantially as described, the spring, U, or its equivalent, to hold said staves in contact with the cam rail or guide without causing said contact to be rigid and inflexible, substantially as described.

Fourth, Connecting and sustaining the rake and reel upon the platform, A, by means of the arm, C, and the braces, E F and H, substantially as described.

Fifth, In combination with the rake staff, M, the pendant rod, V, substantially as and for the purpose set forth.

Sixth, In combination with the pulley, X, the guide pulley, a, and pin, b, for the purpose set forth.

49,670.—Try Square.—John Williams, Shelburne, Mass.: I claim the mode of attaching the tongue, B, to the beam, A, by means of the rod, g, and nut, a, arranged and combined in the manner set forth.

49,671.—Stopper for Bottles.—George R. Willmot, Meriden, Conn.: I claim, First, Attaching the tube, e, to, or forming it in, the same piece with the collar or washer, d, substantially as and for the purpose herein specified.

Second, The stop, f, applied in combination with the screw, B, and nut, c, of the stopper, substantially as and for the purpose herein specified.

Third, Making the upper and lower parts of the elastic plug, A, of the stopper of two different degrees of hardness, substantially as and for the purpose herein specified.

Fourth, Coating the exterior of the plug with flock, substantially as and for the purpose herein specified.

49,672.—Washing Machine.—J. B. Winchell, Chicago, Ill.: I claim, First, The combination of a reciprocating rubbing board, E, and washboard, D, with a wash box, which has two apartments, C C', separated by a division board, b, substantially as described.

Second, The arrangement of the hinged washboard, D, over the apartment, C', in combination with the apartment, C, substantially as described.

Third, The combination of a hinged wash board, D, and reciprocating rubbing board, E, with the two apartments, C C', substantially as described.

Fourth, The construction of oblong bearing blocks, e e, with rubber or metallic springs, h h, and movable pivot connections, i i, for the arms of the rubbing board, E, substantially as described.

Fifth, The inclined board, D', in combination with the hinged washboard, D, substantially as described.

49,673.—Horse Rake.—Tobias Wilmer, Williamsburg, N. Y.: I claim, First, The pivoted inclined teeth, A A, in combination with the carrying beam, B, the wheels, C C1 C2, and arm or tongue, D, all constructed and arranged in the manner and for the purposes specified.

Second, In combination with the above, I further claim the inclined concave, E, arranged and employed substantially in the manner and for the purpose explained.

49,674.—Securing Buttons to Cards.—Edward S. Boynton (assignor to the French Self-fastening Button Company), New York City: I claim the use of a looped or coiled wire, for the purpose of securing buttons to trade sales or show cards, substantially as hereinbefore set forth.

49,675.—Inclinometer.—Aaron Chase (assignor to himself and Timothy How), Somerville, Mass.: I claim the improved inclinometer or inclinometer, made substantially as described, viz., of the three bars, A B C, and the arc, D, arranged and applied together, and provided with levels and sights, as specified.

49,676.—Car Coupling.—John G. W. Coolidge (assignor to Edwin S. Hovey), Portland, Me.: I claim a new and improved mode of connecting and disconnecting railroad cars, called a car shackle, in manner and form as is set forth in these my specifications.

49,677.—Table.—Charles Cuttica (assignor to Henry C. Glinzmann), New York City: I claim parallel moving sections capable of forming a table or a series of shelves, substantially as specified.

49,678.—Capstone for Working Beater Hay Presses.—Peter K. Dederick (assignor to Levi and Peter K. Dederick), Albany, N. Y.: First, I claim the arrangement of the loose pulley wheel, H, with the belt or strap, T, surrounding it, in the manner and for the purpose specified.

Second, I claim the locking bar, W, passing through the rim of the wheel, H, and operating in connection with the notch, a, in strap or band, T, in the manner and for the purpose substantially as described.

Third, I claim the combination of the incline plane, X, the notched strap, the locking bar, L, arranged as and for the purpose specified.

Fourth, I claim the belt, L, arranged so as to lock the lever, I, alternately to the pulley, H, and the clutch pulley, J, and disconnect either or both by moving the hand lever.

49,679.—Machine for Cleaning Carding Cylinders.—Alfred A. Hawley (assignor to himself and Robert B. Hawley), Methuen, Mass.: I claim the machine constructed substantially in manner and so as to operate as hereinbefore described.



49,680.—Kerosene Lamp Burner.—A. B. Hendryx (assignor to himself, H. A. Shipman and Robert Hoadley), Derby, Conn.:

First, I claim the combination of the tongue, F F, with the tube, A, substantially as and for the purpose specified.

Second, I claim a dome, constructed in the manner and for the purpose specified, when combined with the tube of burners.

49,681.—Device for Tethering Animals.—Warren Johnson (assignor to himself and Albert Thompson), Fisherville, N. H.:

I claim the improvement described, it consisting of the rotary swivel or arm, T, the stationary cap or post, A, and the set screw, S, or equivalent means of fastening the post to the supporting bar, the pole being applied to the said arm, and the whole being arranged in manner and so as to operate substantially as hereinbefore specified.

49,682.—Manufacture of the Salts of Chromium.—B. Margulles, Trieste, Empire of Austria, assignor to Jesse and James W. Tyson, Baltimore, Md. Patented in England, Sept. 6, 1864:

I claim the herein-described process for the manufacture of the salts of chromium.

49,683.—Iron for Strap Joints.—William D. Rinehart (assignor to himself, David Z. Brickall and William W. Martin), Pittsburgh, Pa.:

I claim a new article of manufacture, to wit: Iron for strap joints, consisting of strap, gibs and key, said iron being rolled in the form herein described and represented, and for the purpose set forth.

49,684.—Washing Machine and Wringer.—Nathaniel B. Webber, Paoli, Ind., assignor to himself and Thos. B. Jackson, Orange Co., Ind.:

I claim the slides, H, cleets, I, chains, M, pulleys, L, and roller, P, when arranged and combined as herein described, and for the purpose set forth.

49,685.—Mode of Diminishing Friction.—Charles Badin, Paris, France:

I claim, First, The combination of the collar, H, on the axle, with the movable plate, B, supported by the perforated balls, C C C, revolving upon a fixed plate, A, and held to their places by the arms, D D, all arranged in the manner and for the purposes above described.

Second, I claim the mode of piercing the said balls so that the arms, D D, shall have only one joint of contact therewith, in the manner and for the purpose above described.

49,686.—Fire Alarm.—Charles Dion, Montreal, Canada: I claim, First, The adjustable segmental plate, G, bearing the composition spring, H, index, F, and scale, I, in combination with the alarm movement, B, constructed and operating substantially as and for the purpose described.

Second, The stop lever, h, tripping lever, K, stop lever, I, trip lever, m, trigger, d, and swinging lever, c, in combination with the index, F, scale, I, and alarm movement, B, constructed and operating substantially as and for the purpose set forth.

Third, The use of a system of tubes, extending from different places or rooms in a house or building to a single central position, in combination with balls which are held in said tubes by stops that are released by the action of the metallic thermometer either when the temperature rises above or sinks below a certain point, substantially as and for the purposes set forth.

49,687.—Die Stock.—Joseph Koberle, Kingdom of Bavaria:

I claim the several parts arranged and employed, as described in these specifications.

49,688.—Anchor.—Edward Snell, No. 31 Charing Cross, London, Eng. Patented in England July 22, 1864.

I claim the adaptation to the movable arms of double grip anchors, of four horns, which cause the anchor to lie on the ground in the right position and compel the palms or ends of the arms to enter or penetrate the ground and take hold at once—the dispensing with a stock or sector, great holding power, lightness, facility of stowage, non-liability to foul, and facility of withdrawal from foul ground or obstructions, as herein set forth.

49,689.—Apparatus for the Continuous Distillation of Petroleum, Etc.—John Ives Vaughan, London, Eng. Patented in England Oct. 11, 1864:

I claim, First, The treatment of resins and resinous substances by continued or connected operations, whereby the spirit is distilled from the crude substances, and the residual resin volatilized or distilled into a product which becomes solid at the ordinary temperature of the atmosphere, without packing or cooling the resins between the operations, as hereinbefore substantially set forth and described, or any mere modifications thereof.

Second, The construction, combination, arrangement and method of working of the apparatus, for the continuous distillation of resin and resinous substances, coal, petroleum, bone, oil, paraffine, and other analogous acids and hydrocarbons, as hereinbefore substantially set forth and described, or any mere modifications thereof.

#### REISSUES.

2,057.—Steam Boiler Furnace.—Johnathan Amory, West Roxbury, Mass. Patented April 19, 1859:

I claim the method of increasing the combustion and protecting combustion curves, substantially as described.

2,058.—Steam Boiler Furnace.—Johnathan Amory, West Roxbury, Mass. Patented April 19, 1859:

I claim, First, Admitting into the fire-box or chamber of furnaces heat generators, so as to impinge upon and mix with the flame or products of combustion of atmospheric air, by means of, and in combination with, conduits or receptacles, so arranged within, or in relation to, said furnace or heat generator, as to heat the air to the proper degree of temperature during its passage to the said fire-box or chamber, in the manner and for the purposes hereinbefore set forth.

Second, The herein-described method of generating heat; that is to say, forming gaseous fuel by burning coal or other solid fuel, as described, and conveying such gaseous fuel to a separate chamber, there to be consumed by combining with heated air, as set forth.

Third, The combination of a fire-chamber of ordinary or suitable construction for burning solid fuel and for producing combustible gases, with a combustion chamber in which said combustible gases are mixed with air and burned, in the manner hereinbefore described.

2,059.—Broom.—C. L. W. Baker, Hartford, Conn. Patented June 11, 1861:

I claim an improved article of manufacture consisting of a broom, being composed of the fiber of broom corn set in tufts in a block of wood, substantially in the manner as and for the purpose described.

2,060.—Steam Engine.—Edward D. Barrett and H. B. Bigelow, New Haven, Conn., assignees of E. D. Barrett. Patented Jan. 19, 1865:

First, We claim imparting to the valve of the auxiliary cylinder a positive movement from the piston of the principal cylinder by means of the tappet, G, and rocker, F, for the purpose of admitting and exhausting steam to actuate the pistons of the auxiliary cylinder, when the said pistons are constructed of equal areas, and arranged substantially as described, and the steam which actuates them received direct from the boiler, for the purposes of operating the valve or valves of the principal cylinder, substantially as and for the purpose set forth herein.

Second, The pistons, P and P', constructed and arranged relatively to the passages, d d', so as to operate in the manner and for the purpose substantially as set forth.

Third, The arrangement of the check valves, I P', and passages, E and E', in relation to the passages, D and D', and the main valve, substantially as set forth.

2,061.—Propeller Wheel.—R. E. Campbell, New York City, assignee of Thomas Tripp, Buffalo, N. Y. Patented Nov. 22, 1859:

I claim a propeller wheel having blades formed in respect to their main propelling surfaces, and in respect to their outward areas, substantially as herein described.

2,062.—Gates for Water Wheels.—Atlas L. Stout, William M. Mills and John Temple, Dayton, Ohio (assignees by mesne assignments of Elijah Roberts, deceased). Patented April 4, 1864:

First, We claim the combination of a ring and rods, with suitable

mechanism, for simultaneously and uniformly opening a series of gates of submerged center vent water wheels, at a single operation, above the water line, whereby the water admitted to the wheel may be easily regulated, substantially as described.

Second, Connecting rods with the gates so that the former may freely slide through the latter in the manner described, to permit the gate to be closed by hydrostatic pressure, for the purpose specified.



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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-HALF 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 eighteen 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 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.

[See Judge Holt's letter on another page.]

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

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

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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.

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Persons desiring to file a caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. The Government fee for a caveat is \$10. A pamphlet of advice regarding applications for patents and caveats is furnished gratis, on application by mail. Address MUNN & CO., No. 37 Park Row, New York.

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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.

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Every applicant for a patent must furnish a model of his invention is 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 out little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park Row, New York.

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Goods for Competition and Premium must be deposited before Thursday Night, the 28th of September.  
Circulars, embracing details, may be had of the Actuary at the Institute.  
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**How a Wrecked Steamer was Rebuilt.**

The Boston and New Orleans Steamship Company recently purchased the wreck of the *Caledonia*, which went ashore on Cape Cod—having cargo in both ends, and empty coal-bunks in the center, she parted and filled with water in the middle compartments. The other compartments, however, were secure, and much of her cargo was removed after she broke. In this condition she was purchased in February, 1863, by three gentlemen. Many difficulties were experienced in the endeavor to get her afloat, and it was not until the following October, and after it had been discovered that she must be plated over the break in the bent state in which she lay, that, during a severe storm that set the sand bank surrounding her in motion, she moved out toward deep water. A year of delay followed, awaiting the construction of Simpson's Dock, the only one large enough to receive her. There she was straightened and about fifty feet cut from the center, with the exception of the iron keel, which had only been bent. The space was then built up and plated in harmony with the original lines. After this she became the property of the company.

**A Hoop-skirt Manufactory.**

Arms, Bardwell & Co. have a large hoop-skirt manufactory in operation at Northampton, Mass., and the processes through which this article of ladies' wearing apparel passes are quite numerous. The tape is woven and prepared here (a novelty in this country), the raised threads or grooves for the steel being made by a very ingenious chain action. The bands or tapes are then fitted on wooden frames, in various sizes, and sewed. They are ribbed and glued with great dexterity, by hand; the clasping is also done by hand; at first with pincers and then firmly fixed by machine, which, in connection with the glueing process, gives a very strong skirt. Hoops of all sizes, as ordered, are made, ranging from 90 to 120 inches around the bottom. The very best steel is used for hoops, and they are so surely joined as not to break apart. The skirt hoops are so secured under the kid pads, as not to wear through, and stamped with the name of the party ordering. Messrs. Arms, Bardwell & Co. also manufacture pocketbooks and ladies' traveling bags.

**"Drulep" and His Umbrella.**

The *Gazette de France* devotes two of its columns to the new and startling discovery of an umbrella, the cover of which, instead of being of the texture of Robinson Crusoe's, or of alpaca, or silk, is of the last material any one would guess, namely, rain itself. It says any one who, like myself—the correspondent of the *Gazette*—was passing, between two and three o'clock on the road between Sourdes and Perouse, must have noticed a person who, although unknown in the country, attracted universal attention. The rain was pouring down in torrents. He held a cane about 10 in. above his head. The rain falling on this magic wand, spread out in the form of an umbrella, under which M. Drulep, the inventor, walked perfectly sheltered from even a single drop of water. M. Drulep will not as yet solve this mysterious problem; but the marvelous effect produced by this stick is reported to be due to a new application of electricity, and that M. Drulep's stick acts on the principle of the well-known *tourniquet électrique*.

**RICE & EVERED'S TUBE SHEET CUTTER.**

This tool is intended to bore the holes for flues or tubes, in the tube plates of locomotive or tubular boilers. It is designed to do extra good work, and is especially valuable where the tubes are close together, since, in plates that have a hole punched or drilled in them to guide the end of the old tool commonly used, there is great danger of the drill running out, or the holes being badly punched by careless persons. With this tool the work must always be first-class. The hole will be true with the center, and, if the marker lays the sheet off properly, the tube plate will be a fac-simile of the draughtsman's projection in the drawing room.

In detail, this tool is simply a steel shank, A, with a sleeve, B. This sleeve slides, but does not turn on the spindle, being held by the feather, C. There is a thread on the sleeve which fits the hollow shank of the hand wheel, D; when the wheel is turned, therefore, the sleeve is drawn up or down.

The lowest end of the sleeve is formed into a socket, E, in which the cutters, F, are held, and there is a center, G, in the spindle, which works in the center punch mark in the work. The hand wheel rests on a collar, H, and is kept from rising by a nut, I, with a left-handed thread. There is a bracket, J, on the table which supports the sheet to be drilled. These are the details.

The inventors and manufacturers say:—

"The object of this tool is to save time in drilling tube sheets, by not having to drill the center hole, which is now either drilled or punched previously to cutting out the full-sized hole, thus saving one handling of the plates. There is also a saving of scrap iron, as thinner cutters can be used, and the center hole is not cut out, but all left in a solid piece. This

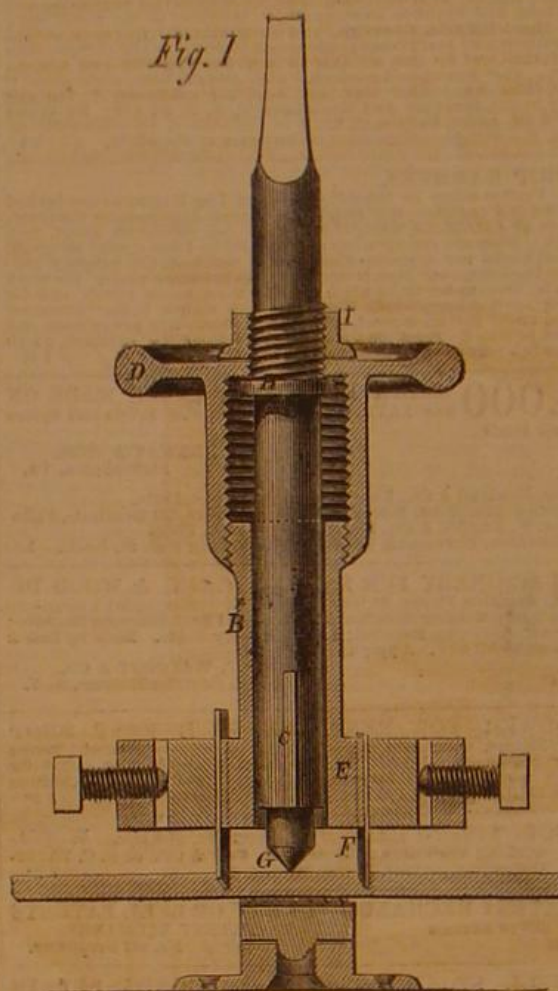


Fig. 2



is no small item where much of this work is done; the difference in scrap iron would soon pay for the tool. It also takes less power to cut than with thick cutters. Another important item is the saving of cutters; these cutters are not half so liable to be broken as those in common use. The reason that these cutters are not so liable to break is, that there is no slack motion to the cutters; they cannot go through or draw themselves into the sheet any faster than the natural feed. All the holes must be, with this tool, cut exactly true with the center punch mark; there is no chance for the drill to run; and where holes are drilled pretty close together, this is also a very important object—locomotive builders, especially, would find this a great help to them in doing good work. It is necessary to have a good solid drilling machine, in using this tool, in order to give the best results. We have used this tool for nearly a year, and are better satisfied with it every day, and have often cut at the rate of 600 holes two inches diameter in five-sixteenths iron, per day of ten hours. The patent for whole States is for sale. We can also manufacture the tools for sale, and have some on hand."

This invention was patented through the Scientific American Patent Agency on May 30, 1865, by D. E. Rice and William Evered, of Detroit, Mich.; for further information address them as above.

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Vol. XIII—No. 12.  
(NEW SERIES.)

NEW YORK, SEPTEMBER 16, 1865.

\$3 PER ANNUM  
IN ADVANCE.

## Improved Sewing Machine.

The inventor or author who cuts loose from conventionalities, and strikes out a new path, is certain to achieve a more enduring success than those who accept what is as right in principle and proceed to engraft on that.

Until the year 1852, the mode generally adopted of operating the needle and shuttle in the sewing machine, was to stop each instrument during the operation of the other; this necessitated the use of cams to impart the motion so as to cause the stop or "rest" at precisely the right moment; and up to that time no shuttle sewing machine had been made without cam motions either on the needle or shuttle, or both. In that year the inventor of the sewing machine herewith illustrated commenced his experiments. Rejecting the cam and all other like devices for operating the sewing instruments, as totally unadapted to the inevitable prospective requirements of the machine, and taking the simple elements (needle and shuttle) disencumbered of the usual devices for imparting their motions, he set out to produce a radically new system of mechanism for operating these instruments. In the year 1854 he exhibited to the editors of this journal a shuttle machine with his new combination of movements, the needle being worked as it never had

been before in such a machine, viz., by a true eccentric, imparting an easy and continuous motion; while the shuttle, driven by a crank pin, also had a continuous and uninterrupted movement—a combination altogether unlike any sewing machine then known—while the whole construction was exceedingly novel and very simple. This, we believe, was the first shuttle sewing machine ever made having continuous or crank motions. Since then Mr. Smith has obtained, in all, eight patents for improvements looking to the perfection of this class of machines, in nearly all of which the continuous or crank motion prevails throughout.

In the present machine he has embodied some of the most important results of his experiments for the past twelve years, making a lock stitch by a needle and shuttle having continuous or crank motions imparted by a very direct and simple mechanism. The needle and shuttle are also operated or moved relatively, so as to draw the threads into the work in a manner that adapts the machines especially to thin fabrics, while the usual adaptability to heavy work, which characterizes the shuttle machine, is retained intact.

Fig. 1 is a perspective view of the machine, and reveals all the working parts except the feed bar, which is seen in the sectional view, Fig. 2. All the working mechanism, except the needle arm, is arranged upon a single casting, consisting of the shuttle race, A, hanger, B, boss, C, and pendent, D. This casting is set into an opening made for the purpose

in the bed plate, E, and secured therein so as to form a part thereof. The boss, C, is the bearing of the main shaft, and the pendent sustains the fulcrum pin of the vibrating lever, F, which gives the reciprocating motion to the shuttle driver through the connecting link, G. The driving pulley, H, has an eccentric cast on the outside, which is encircled by one end of the strap or connection, I, and the other end is at-

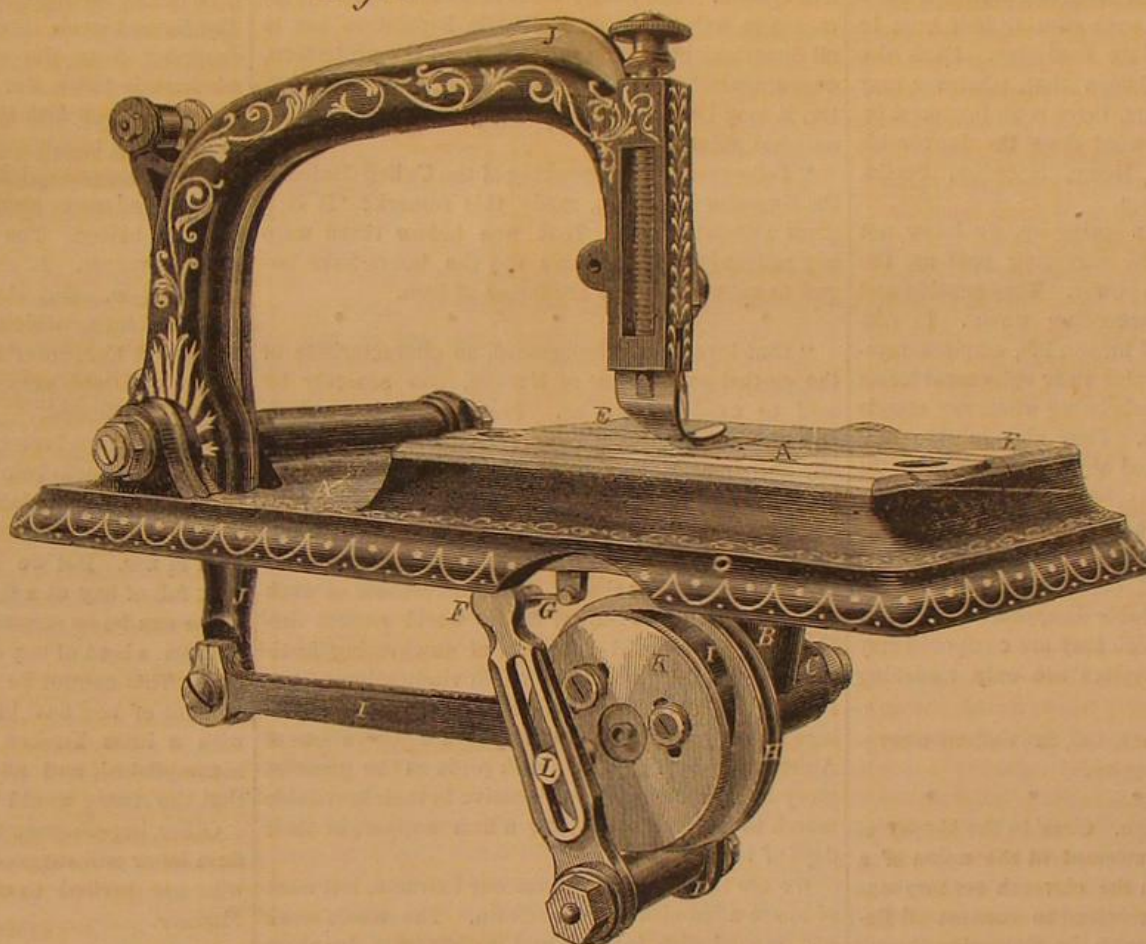
is made adjustable, to follow up the wear, thus imparting the highest degree of durability.

The simplicity of this machine is apparent, indeed it would be difficult to produce the three independent movements of needle, shuttle and feed, with a less number of actuating parts.

These sewing machines are made by the Continental Manufacturing Co., No. 18 Beekman street, (A. W. Goodell, Agent, Box 3,631), New York.

The patent for this invention was allowed on Sept. 7, 1865; the invention has also been patented in Great Britain and France, and other foreign patents are pending.

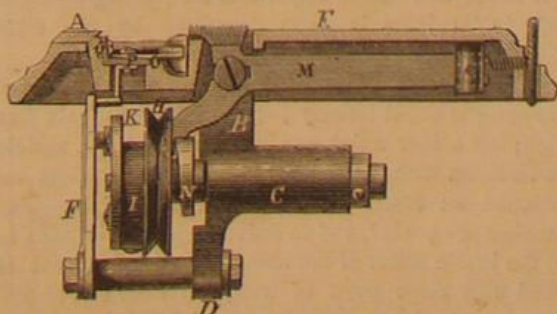
Fig. 1



EARLE HARRY SMITH'S CRANK-MOTION SHUTTLE SEWING MACHINE.

tached to the lower extremity of the needle arm, J. To the eccentric is attached a disk, K, with a crank pin, L, moving in a groove or slot in the lever, F.

Fig. 2



The disk is adjustable on the eccentric for the purpose of timing the needle and shuttle. The feeding device (see Fig. 2) consists of the bar, M, which has an up-and-down and back-and-forth movement imparted by an eccentric, N. O is the shuttle driver; it is attached to a slide, P, and receives its motion from the vibrating lever, F. The slide, P, runs in a dovetail groove, one side of which is solid, and the other formed of an adjustable plate, Q, by which it is always kept up to its bearings.

All the movements of the machine being continuous, and effected by the crank or eccentric, it is evident that the machine will run very quietly.

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chine's mode of operation is by a circular row of chisels; with an inner row, standing in an oblique direction, and then falling on a mass of stone with the force of several tons, breaking the stones into small fragments, which are then drawn up by an exhausted receiver, and the chisels are then made to work on a fresh surface. The diameter of the hole is regulated by the circumference of the socket holding the chisels. The machine can bore a hole 4 feet in diameter, but the wider the surface the force is the more diminished. In the present instance the bore was only 18 inches. An average of 27 feet 8 inches of well was sunk per week during the operation of the machine. The cost per foot was 19s. 4d. The cost of the machine was £600, but it was let, including boiler, at the rate of £6 a week. In Yorkshire the machine had bored through 40 feet of hard stone, used as mill-stones. In boring for any great depth, it was found cheaper, after boring 300 or 400 feet, to reduce the diameter from 18 to 15 inches. The machine has bored wells 4 feet in diameter, and 50 feet deep as at Birkenhead. The cost was not increased in the same ratio as the diameter. If required to sink a pit shaft 12 feet or 18 feet in diameter, a series of holes 2 feet in diameter would be sunk, as the practical limit of the machine is regarded as being 2 feet in sinking a single hole.—*London Builder*.

EXPERIMENTS on the N. Y. Central railroad with peat show that 2,800 lbs. of peat will run an engine about 175 miles.

11/2/65



## DRAPER'S CIVIL POLICY OF AMERICA.

Professors Lewis Agassiz and John W. Draper are the most eminent representatives of the least numerous but most welcome class of those who have transferred their residence from Europe to this country—men of high intellectual culture. In taking up a new work of Dr. Draper's we expected new evidence of untiring application, of large acquirements in every department of knowledge, and of even too great facility in bold and broad generalization; but the melodious eloquence in which the great argument is clothed we did not anticipate.

It has been a favorite notion of Professor Draper's that the moral and mental characteristics, the civilization and the institutions of the various races of men, result mainly from the climate and other physical conditions by which they are surrounded, and he has written this work to show the application of his views to the present and future condition of the United States. The following extracts will show—better than any description or criticism of ours—the general drift of the author's thought, as well as the charming style in which he gives it utterance:—

"Nations, like individual men, are born and die—an unpalatable truth, for each tries to hide from itself the contemplation of its final day. Each also amuses itself with the delusion that, whatever may be the hapless lot of others, there is an immortal future in store for it. But what does the inexorable hand of History write? Rome, Macedon, Persia, Assyria, Egypt, all are gone.

"The waves of the ocean spring up, we know not where or why. They come careering past us, the very emblems of resistless power. They subside and are lost among other succeeding waves. In like manner, on the vast sea of human life, empires mysteriously emerge. They raise their ephemeral forms conspicuously high, overwhelming whatever stands in the way of their march. They also subside and are lost, but the unfathomed abyss of humanity still remains.

"To the infinite expanse of the ocean belongs endless duration. Its waves are only temporary. The forces that have impelled them into existence are soon expended; an inevitable disappearance awaits them. The material of which they are composed may be eternal, but they themselves are only vanishing forms.

"Vanishing forms! Such, too, are nations emerging from the mass of humanity.

"But let us take courage. Once in the history of the world has a parallel attempt at the union of a continent been made. In the eleventh century was born a great man, who resolved to convert all Europe into one federation, with the Sovereign Pontiff at its head, and emperors and kings his proconsuls—that Europe which, as we have seen, presents all sorts of climates and all kinds of modified men. A religious foundation was, under the circumstances, the only one that could be given to the contemplated structure; but Gregory VII. saw not only its capabilities, but its defects, as any one may find who will consider his relations with the heretic Berengar. Those defects he would have remedied if he could, and brought that foundation into more complete accordance with human reason.

"What was the practical instrument on which Gregory VII. relied in carrying out his intention? His legates could pass from Scotland to Spain, from the Atlantic to the confines of Asia, and meet in every monastery and at every church men speaking the same tongue. The Latin language gave him intelligent allies all over Christendom, but allies only among the men of education. With us, how much better is the prospect—one language from ocean to ocean, and that among the lowly as well as the high. That bond of union is for us a bond of strength. It aids in compensating for diversities of climates. It gives us a common history of the past, a common hope for the future. Conterminous groups of men are far more effectually isolated by different forms of speech than by intervening rivers and mountains, but groups that are far apart may be in communion through a common tongue. They may learn to have faith in the greatness and permanence of their political creations, and in unbroken unity discern unconquerable power.

"With such an inappreciable advantage in our favor, we are encouraged to look again at the great problem before us, and to ask, Can we not neutralize those climate differences, which, if unchecked, must transmute us into different nations?

"In two words, I think, we find an answer—Education and Intercommunication. Nor is this the suggestion of mere theorists. Under that formula four hundred millions of men—one-third of the human race—have found stability for their institutions in China. By their public school system they have organized their national intellect; by their canal system they have made themselves, though living in a climate as diversified as ours, essentially one people. The principle on which their political system is thus founded has for many thousand years confronted successfully all human variations, and has outlived all revolutions. But what is their public education compared with what ours might be? what is their canal system compared with what our railroads will become?

"Of education I shall have nothing more to say, for all intelligent persons concur in the belief that it is absolutely necessary to the perpetuity of the American system. The public value of locomotion is by no means so well understood. While legislation has in all directions been brought to bear on the protection, encouragement, development of the former; the latter, it may be said, has been altogether neglected in a national point of view.

"Talleyrand, when speaking of the United States to the Emperor Napoleon, made this remark: 'It is a giant without bones.' That was before there were any railroads; but since his day the bones have begun to grow, and they are bones of iron.

"That love of the homestead, so characteristic of the settled populations of Europe, can scarcely be said to exist among us. The children leave their father's hearth without reluctance, for he is perpetually anticipating leaving it himself. It might have been feared—perhaps was feared by many observant persons—that this loss of local patriotism would imply the loss of national sentiment, but the experience of the civil war has shown the incorrectness of such a foreboding. The history of the world cannot furnish a more splendid example of unwavering fortitude, unshrinking self-sacrifice, in vindication of national life. The acts of which it has been our privilege to be eye-witnesses, will by future generations of Americans be pointed to with pride as the greatest glory of their history—an incentive in their inevitable march to imperial greatness, a firm support in their days of trial."

We are tempted to continue our extracts, but want of space admonishes us to refrain. The whole work will be read with interest and satisfaction by every statesman and every man of thought into whose hands it may fall. The pleasure of reading it will be enhanced by the elegant paper, type and binding in which Messrs. Harper & Brothers have presented it to the world.

## Apparatus for Canning Fruit.

A novel and useful apparatus for putting up fresh fruit in its juice is thus described by the *Ohio Farmer*:

"It is a steam closet, made like an upright case of drawers; is about twenty inches square and six feet high; has a door which can be fastened at top, middle and bottom with iron keys in bolts, as shutters are fastened on store windows—all steam-tight. The peaches are peeled, cut in halves, put in tin pans to fit the inside slides of the steam closet; the closet is filled with these pans of fruit, the door closed and keyed, steam let on with a powerful sizz for two or three minutes, then shut off, the doors opened and the pans set upon tables, where the girls pick up the pieces with forks and put them in cans; the cans thus filled are passed along to the end of the tables, where there is a cauldron of rich sirup made of crushed white sugar, a dip of which is poured in to fill the spaces among the fruit, and the cans are sealed up. This steaming is much better than the old boiling process, as the watery juices are got rid of, also the acid juices which are secreted under the rind of the peach, all of which, being left in the pans, are poured into a vat and there converted into peach brandy. By this steaming, also, the shrinkage is

taken out, and the fruit goes into the cans as clear and white as we see it in prize jars at the fairs, while the sirup which takes the place of the watery juices makes a rich sauce when they come to the table."

## Wants Unsupplied.

The labors of another baying season—a season about terminating, and one which has given employment to a greater number of machines of various descriptions than has heretofore been employed—have taught several lessons which should not be forgotten, and we allude to one or two now, hoping that some one will improve upon our suggestions and endeavor to aid in perfecting what so much needs to be accomplished.

1. A better horse-rake is needed. We have witnessed the operation of many different rakes the present season, and are satisfied that they are all more or less defective. Whitcomb's rake is highly recommended, and is, perhaps, as good as any in use among us, but, after having examined its operations upon several fields, we are satisfied it can be much improved, or wholly superseded, by a rake that will give better satisfaction. It is too long in unloading. The horse travels three feet or more while the hay is dropping from the elevated rake, consequently the windrow is loose, flat and uneven, and requires considerable labor with the hand-rake to put it in shape to bunch up to advantage. Could the rake be elevated and dropped quicker, or the form of the teeth so constructed as to clear itself of hay sooner, it would be much better. The true principle of a horse-rake is the revolver. It rakes cleaner and makes a better windrow. But the old revolver possesses many disadvantages, which, we think, are overcome in Wallace & Carpenter's wheel revolver. The latter is a rake we think very highly of, although it is somewhat complicated.

2. We want a better contrivance for unloading hay. The horse pitch-fork was a great improvement over hand power—especially in conveying hay to the top of high mows, and even now it is the best thing of its kind in use. But we want a contrivance to unload a rack full of hay at a time. We believe that carts and barns can be so constructed that with a single pull of a horse a load of hay can be dumped at once into the bay. This cannot be done of course after a certain amount of hay has been hauled in, but we believe with a little Yankee ingenuity the thing can be accomplished, and all barns now built be so altered that the thing would work.

Other improvements in machines for performing farm labor will suggest themselves to observing men, who are invited to communicate the same.—*Maine Farmer*.

## New Artificial Light.

Mr. James Wilkinson, of Chelsea, is endeavoring to rival the magnesium light, for photographic purposes, by means of a mixture of phosphorus and nitrate of potash. He recently burnt a quarter of a pound of this mixture in his garden, at night, with a view to obtain a photograph of a wind engine which was being erected in an adjoining garden, and he states that "the length of time from when it was first lit until it was finally burnt out was nearly six minutes. The utmost cost was a fraction over fourpence. The reflection of the light might be seen for two miles round. So bright was it that the fire-engine authorities mistook it for an ordinary conflagration, and hurried their engines to the spot. Upon finding no trace of the fire they returned, rather chagrined, not, however, without first satisfying themselves by a thorough examination of the premises. All around appeared one blaze of light, the sky looked like a mass of fire." The picture taken during this startling illumination "came out," we are told, "with great sharpness and vividness, the houses near being brought out prominently. It, in fact, equaled any picture taken on a bright day."—*Mechanics' Magazine*.

OAKEN barrels may be prevented from coloring spirit by dissolving one part of ammonia alum and two parts of sulphate of iron in one hundred parts. Well wash the casks with this solution, boiling hot, and allow them to stand twenty-four hours. Then rinse out the casks well, dry them, and finally give them a washing with a thin solution of silicate of soda.



## 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:—

**Paper Holder.**—This invention consists in a novel mode of constructing paper holders, for holding files of newspapers, and also documents and letters, the same being composed of two strips of wood or other light material, which are secured to each other so as to embrace the files of paper between them by means of a screw clamp of a peculiar construction, and provide space for gathering and folding the lower part of large newspapers, to accommodate the reader when he wishes to read the head of its columns. J. W. Foard, of San Francisco, Cal., is the inventor.

**Chambering Artesian Wells.**—The object of this invention is to produce an implement or apparatus by means of which the bottom of an artesian well, or any other part thereof, can be chambered out or enlarged in diameter, and it consists in a tube which carries, in a diametrical chamber at its lower end, a horizontal drill capable of being driven outward beyond the periphery of the tube, in order to cut away the sides of the well when the tube which carries it is rotated. George F. Case, of Brooklyn, N. Y., is the inventor.

**Horse Collar.**—This invention consists in constructing a horse collar with a wooden front portion, the rear being of leather or other flexible material, stuffed or padded, said wooden portions being provided with a leather yoke or pad, and connected by a strap, whereby a great saving is effected, both in labor and material, and a very easy and comfortable collar for a horse obtained. C. J. Fisher, of Waukon, Iowa, is the inventor.

**Axle Box.**—The metallic boxes, for the wheels of vehicles are, at present, made of cast iron, and as soft as possible in order to admit of the interior of the box being bored out and polished or finished perfectly true, in order to run well on the axle and avoid unnecessary friction and consequent wear and tear. Hard boxes would be far more durable than the soft ones, if they could be worked after they are cast; chilled cast iron, for instance, would answer an available purpose, but the difficulty alluded to precludes its use. The object of this invention is to obtain a box which will be hard and durable, and still admit of being bored out and polished, so as to run perfectly true on the axle. To this end the invention consists in constructing the box of wrought iron, and after boring and polishing its interior surface perfectly true, rendering the same hard by the ordinary process of case-hardening, or of steel-converting. Charles Cook, of Winsted, Conn., is the inventor.

**Combined Bureau and Commode.**—This invention consists in combining, in one and the same piece of furniture, a bureau and commode, the commode being so arranged, with regard to the bureau, that it can be moved out and in at pleasure, according as it is desired or not to use it—the commode, when not in use, being wholly incased within the bureau. By this combination a very neat, simple and compact piece of furniture is obtained; and in addition to a bureau and commode, other necessary articles, used for similar purposes to the commode, are also arranged in connection with it; the whole presenting a most convenient and desirable piece of furniture, worthy the examination of furniture manufacturers. George W. Koch, of No. 150 Wooster street, New York, is the inventor.

**Basket.**—This invention consists in making the base of baskets, hampers, and other similar structures, in such a manner as to protect the bottom and corners from injury and wear, the base being formed with as many sides as there are sides to the basket, each side being a solid piece, and the several pieces being framed or joined together at their ends in any suitable manner. E. B. Lyman, Waterbury, Conn., is the inventor.

**Baling Press.**—This invention relates to a press in which the follower can be operated by a slow and by a quick motion, which are combined so as to form a compact and comparatively light and easy-working mechanism. The slow motion consists of a hollow screw spindle which screws into a worm-wheel gear-

ing into a worm and it connects with the follower by a rod which passes clear through said screw spindle, and is connected to it by a suitable key. The extreme end of this rod forms a toothed rack, which gears in a suitable pinion, and if the key which connects said rod with the hollow screw spindle is withdrawn the pinion and rack form the quick motion for the plunger, which can be used independent of the slow motion. Joseph P. White, No. 418 Greenwich street, New York, is the inventor.

**Apparatus for Steeping, Growing and Drying Malt.**—This invention consists in effecting the malting operation by means of an apparatus composed of a wire-gauze cylinder mounted on a hollow shaft, through which steam is admitted to the helical heating pipe in the interior of the wire-gauze cylinder, in combination with a cylindrical case, one half of which is surrounded by a jacket, in such a manner that the steeping, the growing and the drying can be effected without removing the malt from the apparatus, and not only much time and labor is saved, but also a better product is obtained than by the ordinary malting process; and, furthermore, the malting, operation can be effected in the hot season as well as in winter time. A. Kreusler, of New Lebanon, N. Y., is the inventor.

**Ventilator for Hats and Caps.**—This invention relates to a ventilator for hats and caps, which is constructed of a supporting plate of sheet steel or other pliable material, in combination with a spring or a narrow strip of hardened sheet steel, or other suitable material, which is fastened to the supporting plate, leaving a crescent-shaped space between its outer surface and the inner surface of the supporting plate, in such a manner that, by means of the supporting plate, the ventilators can be readily secured in a hat or cap, and through the crescent-shaped space sufficient air finds access to the interior of the hat or cap to cool the brow of the person wearing the same; and, furthermore, by the flexible spring the ventilator is free to accommodate itself to the shape of the head without throwing the hat or cap out of shape. A. Komp, No. 184 Fulton street, New York, is the inventor.

**Device for Holding Reins or Harness Lines.**—Much annoyance and embarrassment are caused, on leaving a horse and carriage standing for a time, by the necessity of contriving some way of securing the lines in a manner that will prevent their getting under the horse's feet; the object, therefore, of this invention, is to provide a simple device, to be attached to the dash-board of a carriage, which will clamp the reins and hold them firmly until again required for driving the horse; and it consists in the construction of a wooden or metallic clamp, which is to be secured to the dash-board of a carriage, and which has two jaws, arranged so as to be pressed together by suitable springs, into which the reins are placed, when they will be firmly held until removed. T. L. Tripp, of Prescott, Wis., is the inventor.

**Drill for Boring Oil and other Wells.**—The object of this invention is to produce a drilling apparatus which will remove the broken and pulverized rock from the bore, and collect it in the rod of the drill, at the same time discharging the water from the rod, so as to allow the heavier matters to be retained in the rod until the receptacle provided for them is filled. This is accomplished by means of a tubular drill rod containing a central tube, which is directly above the valve box, and an annular chamber surrounding said tube, and communicating therewith by means of perforations in the sides of the tube, through which the detritus is received into the annular chamber. Lewis H. Bowman, of Norristown, Pa., is the inventor.

**Manufacture of Writing Fluid.**—This invention consists in the use of an ink or writing fluid composed of an acid and coloring matter that can be combined therewith, to be used in combination with a paper, the color in which may be discharged or changed by each acid, and the texture of the paper also changed or weakened by the action thereof, in those parts that are written upon, and the possibility of alteration and erasure is prevented. Henry C. Bailden, of Edinburgh, Scotland, is the inventor.

THE Farmers' Club has adjourned for four weeks.

## MISCELLANEOUS SUMMARY.

**PEAT.**—The editor of the *Lewiston Journal*, having made a visit to Mr Farwell's peat bog, says:—Mr. F. estimates that it costs him three dollars per cord to get the peat to his bleachery; and he considers a cord of peat as valuable as a cord of wood. Estimating the wood at eight dollars per cord, there is a saving in the use of peat of five dollars per cord. Now Mr. F. has from forty to fifty acres in his peat bog, and the peat will average three feet in depth, giving certainly one thousand cords for the acre, or fifty thousand cords for the whole bog. Profit per cord \$5; profit on 50,000 cords, \$250,000.

THE value of water-tight compartments in steamers was well illustrated in the case of a collision on Lake Huron, one of the unfortunate vessels having been taken into port sixty miles or more from the scene of the accident, an unsightly wreck forward, great plates of iron hanging by shreds, bent, twisted and torn, but the joints of her first partition tight as a steam boiler.

LARGE fields of cotton are growing in California—over one hundred acres in one field looking well. The State of California offers a bounty of \$3,000 for the first one hundred acres of cotton—also \$3,000 for the first one hundred bales of three hundred pounds each. Over \$100,000 is donated by the State for the encouragement of agriculture, in the raising of various products.

THE Russian Government has lately given up the working of its gold mines in the Ural Mountains, and has arranged for them to be worked by private enterprise. The results of this change have been very remarkable. The quantity of metal extracted is now increased ten-fold.

A NEW RAT TRAP.—Take a smooth kettle, fill to within six inches of the top with water, cover the surface with chaff or bran, place it where the rats harbor, and it will drown all that get into it. Thirty-six were taken in one night by this process.

It is stated that there is not a single ton of iron in the whole Lehigh Valley remaining unsold at the present day, and many of the establishments have orders ahead.

## New Fuel.

A newspaper of Tepic, Mexico, speaks in high terms of a late discovery that has been made to apply to purposes of fuel the stone of the guacoyol, the fruit of a species of palm that grows on the Pacific side of Mexico. From experiments made on board of English war steamers, it has been discovered that, used as fuel, the stone of the guacoyol is equal to the best coal, both for the length of time it burns and the intensity of heat produced. It has likewise the advantage over coal, that there is no disagreeable smell from the exhalation of gas, nor does it dirty the holds, nor the persons who have to take it out; its shape is also in its favor for employing directly, and it is not subject to spontaneous combustion or damage by leakage of the ship.

The guacoyol, as already stated, is the fruit of the palm with which nature has covered the Mexican coast of San Blas and the valley of Banderas. The quantity of this fruit which can be collected annually is incalculable. Thousands of tons, says the Tepic newspaper, can be gathered at a very slight expense, and easily supply all the steamers of the Pacific coast—the difference of price between it and coal at San Francisco being about one-half. The objection is that the supply can only be temporary, as the daily consumption of one vessel would take the produce of thousands of trees to supply it.—*Mining and Petroleum Standard.*

## Aniline Colors.

Few of the aniline colors will stand the continued action of light; to which difficulty must be added, in the case of oil painting, their rapid decomposition by the common varnishes, which mostly contain metallic oxides. A recipe has been furnished us for preparing these colors in a manner to avoid all objections. The dye is to be dissolved in alcohol; this solution is to be saturated with gum dammar, the filtrate to be poured into a solution of salt water, and dried. This is then incorporated with an oil varnish which must be free from lead.—*Druggists' Circular.*



**Improved Atmospheric Hammer.**

This hammer is highly approved of by many of our largest machine makers, and over forty are now in use in different parts of the country. It can be managed with great accuracy, will strike a light or heavy blow, runs rapidly, and is under perfect control. We regard it as a useful machine where die or other work has to be done. We never publish certificates in connection with our illustrations, and are therefore obliged to omit those shown us by the manufacturers, who will be happy to furnish them by mail. This hammer works by compressing air in the cylinder

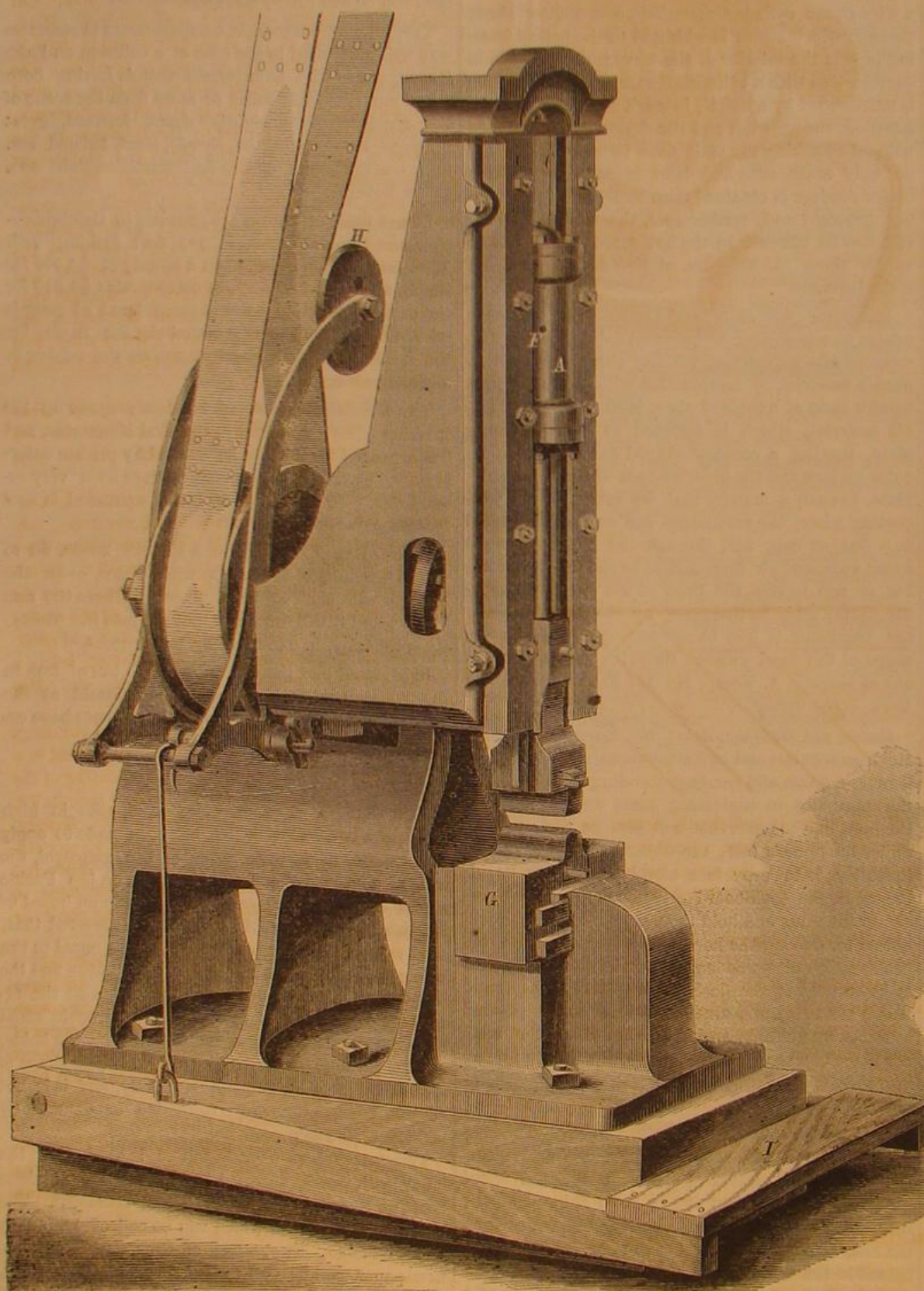
very highly. This condensed air is the force stored up to make the blow, for so soon as the connecting rod turns the bottom center, the confined air expands instantly and thus throws the piston and hammer down with great force. This action is repeated at every revolution, and the height of the cylinder is altered so as to forge large or small work by lengthening or shortening the connecting rod. The hammer is lifted at the ascending stroke by the compressed air below, as we stated previously, and this also aids the cylinder in compressing the air for the return blow, and it is owing to the rapid action of

Charles Merrill & Sons, 556 Grand street, New York City.

**Lactometers Not Reliable.**

Mr. Theodore Moith, of Fishkill, writes to the New York Times as follows:—

"A few days ago you advised the milk consumers to arm themselves against the adulteration of milk with an instrument called a lactometer, made on the same principle as all other aerometers. Now, if the milk of all cows, despite all difference in feeding, season of the day and year, temper and quality of the cow,



**HOTCHKISS'S ATMOSPHERIC HAMMER.**

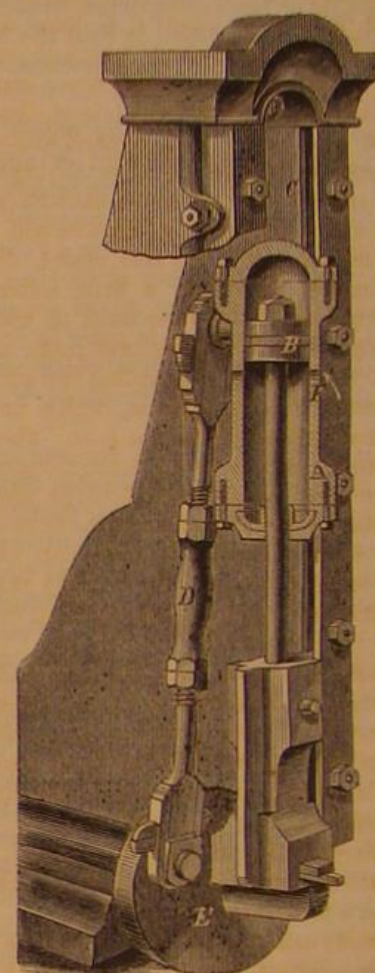
der, the cylinder itself sliding up and down between guides. The following description will render it intelligible:—

The air is compressed by a cylinder, A, and piston, B (see Fig. 2). The cylinder moves in the slides, C, by the action of the connecting rod, D, driven from the face plate, E, by belting, in the usual manner. There are two small holes, F, in the cylinder, A; through these the air enters. The whole machinery is carried in a strong iron frame. Now, if we suppose the cylinder to ascend, the air will enter through the holes, F, and be compressed as the cylinder goes up. This compression is at the bottom of the cylinder, and therefore lifts the hammer moving in the slides. By the time the hammer is lifted the connecting rod arrives at the top center and commences to descend. The air then enters above the piston, and as the cylinder still comes down condenses the vol-

the two movements that the piston does not fall before it obtains the advantage of the air compressed above it.

It will be seen that this hammer is exceedingly simple in its construction; there are no valves about it to get out of order, and the packing is exceedingly durable and easy working. Both that in the piston and in the cylinder head is made of the cup-leathers used in packing hydraulic rams, and they have run for months without leakage or perceptible wear. The dies are fastened in with keys, and the anvil block, G, is adjusted by another key, so that the dies can be set properly without delay. The speed of the hammer is regulated by an idler pulley, H, which can be operated by the treadle, I.

The patent bears date May 3, 1864, and was issued to Bennett Hotchkiss, of New Haven, Conn. For further information address the sole manufacturers,



similarity of adulterating substances, would always show in its pure state the same specific gravity at a certain temperature, a lactometer would be the thing. But under existing circumstances it is the most fallacious of the many got up for that purpose. The most eminent chemists in Europe have come by this time to this conclusion. You can buy in your city, at any chemical store, these lactometers at seventy-five cents per piece, but in the hands of the public they would prove a nuisance, and would make any smart milk-dealer chuckle in his sleeve, as nothing is so easy as to give milk the proper specific gravity. In Europe they have used a number of different contrivances, whereby the police tried to control that class of trade, but to no purpose. Till something more suitable turns up it would be best for the people to patronize the manufacture of condensed or solidified milk, as these manufacturers, from the nature of their business, can only work well with pure milk, and have, or can have, the scientific control these demands. One of the simplest, best, worth relying on, is: To evaporate the milk over a water-bath and find the solid constituents of the milk. This amount, in average milk, is from 12 to 14 per cent. But these easy tests would require at least an outlay of \$2 or \$3 for a scale, besides some hours' patience."

**National Debt.**

	Amt. Outstanding.	Interest.
Debt bearing interest in coin.....	\$1,108,310,191 80	\$64,500,590 50
Debt bearing int. in lawful money.....	1,374,478,103 16	73,531,037 74
Debt on which interest has ceased.....	1,503,029 09	.....
Debt bearing no interest.....	373,398,256 33	.....
<b>Total.....</b>	<b>\$2,757,689,571 43</b>	<b>\$138,031,628 24</b>
<b>LEGAL-TENDER NOTES IN CIRCULATION.</b>		
One and two years' five per cent notes.....	Amount.	
United States notes, old issue.....	\$33,954,230	
United States notes, new issue.....	402,968	
Compound interest notes, act of March 3, 1863.....	432,757,601	
Compound interest notes, act of March 30, 1864.....	15,000,000	
<b>Total.....</b>	<b>\$684,138,999</b>	

The foregoing is a correct statement of the public debt as appears from the books, Treasurer's returns and requisitions in the department on the 31st of August, 1865.

HUGH McCULLOCH,  
Secretary of the Treasury.



## Armenian or Diamond Cement.

This article, so much esteemed for uniting pieces of broken glass, for repairing precious stones, and for cementing them to watch cases and other ornaments, is made by soaking isinglass in water until it becomes quite soft, and then mixing it with spirit in which a little gum mastic and ammoniacum have been dissolved.

The jewellers of Turkey, who are mostly Armenians, have a singular method of ornamenting watch cases, etc., with diamonds and other precious stones, by simply glueing or cementing them on. The stone is set in silver or gold, and the lower part of the metal made flat, or to correspond with the part to which it is to be fixed; it is then warmed gently, and has the glue applied, which is so very strong that the parts so cemented never separate; this glue, which will strongly unite bits of glass, and even polished steel, and may be applied to a variety of useful purposes, is thus made in Turkey:—Dissolve five or six bits of gum mastic, each the size of a large pea, in as much spirits of wine as will suffice to render it liquid; and in another vessel, dissolve as much isinglass, previously a little softened in water, (though none of the water must be used,) in French brandy or good rum, as will make a two-ounce vial of very strong glue, adding two small bits of gum albanum, or ammoniacum, which must be rubbed or ground till they are dissolved. Then mix the whole with a sufficient heat. Keep the glue in a vial closely stopped, and, when it is to be used, set the vial in boiling water. Some persons have sold a composition under the name of Armenian cement, in England; but this composition is badly made; it is much too thin, and the quantity of mastic is much too small.

The following are good proportions:—Isinglass, soaked in water and dissolved in spirit, two ounces (thick); dissolve in this ten grains of very pale gum ammoniac (in tears,) by rubbing them together; then add six large tears of gum mastic, dissolved in the least possible quantity of rectified spirits.

Isinglass, dissolved in proof spirit, as above, three ounces; bottoms of mastic varnish (thick but clear) one and a half ounces; mix well.

When carefully made, this cement resists moisture, and dries colorless. As usually met with, it is not only of very bad quality, but sold at exorbitant prices.—[Tinman's Manual.]

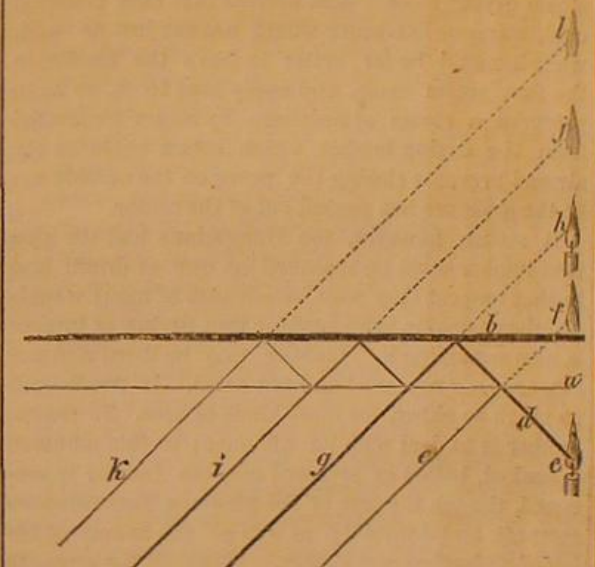
## SEEING JUPITER'S MOON'S IN A LOOKING-GLASS.

Having received several communications stating, that by looking at the reflection of the planet Jupiter, in a mirror, his moons could be seen by the side of him, we concluded to try the experiment, and, sure enough, by the side of the planet was a bright speck resembling the appearance of one of the moons as seen through a telescope. We, of course, immediately suspected that this was the reflection of the planet from the front surface of the glass, appearing by the side of the brighter reflection from the amalgam at the back; and, by changing the position of the mirror, this suspicion was fully confirmed, for the "moon" could be shifted at will to different sides of the planet, and even two moons could be made to appear. On looking at the reflection of our moon in the mirror, two moons appeared, one much brighter than the other; this phenomenon resulting from the same action of light as in the case of Jupiter.

This action may be observed by looking, at a sharp angle, at the reflection of any bright object, especially a candle or gas flame, in a mirror. If the mirror be of thick glass, several images of the flame will be seen, the second one always the brightest. The first is formed by the light reflected from the surface of the glass, the second by that reflected from the amalgam at the back, and the third by light which has been reflected twice—once backward from the front surface of the glass till it struck the amalgam, when it was reflected forward from the metal; this action is repeated to form the other images, which, of course, gradually grow fainter from the diminution of light at each reflection.

The accompanying diagram illustrates the subject. *a* is the front surface of the mirror, and *b* the metal sheet at the back; *c* is the candle, and *d* the beam of light issuing from it. As this beam strikes the front surface of the mirror, a portion is reflected in

the direction *e*; and if this ray is received by an eye, an image of the lamp will be seen at *f*. The ray reflected by the metallic surface is represented by the line, *g*, and the image of the candle formed by this may be seen at *h*. This image is brighter than the first, in proportion to the larger amount of light reflected from the metal than from the front of the glass.



If the angle is sufficiently acute, as the ray, *g*, emerges from the glass, a portion of it will be reflected inward, against the metal back, and will rebound outward at *i*, forming a third image at *j*, fainter than that at *h*.

As the ray, *i*, emerges, a portion of it will be reflected inward from the surface; rebounding against the metal back, issuing in the direction, *k*, and forming a fourth and still fainter image at *l*. The beam of light will thus continue to be subdivided, forming images more and more faint, until they cease to be visible.

The reflection of light from the surface inward, as it emerges from one transparent medium into another, takes place at an acute angle only; and the requisite acuteness of the angle varies with different media; varying even with different kinds of glass.

## Building Ships in New York for the Japanese Navy.

Sometime since the Japanese government appropriated three millions of dollars for the construction of three powerful steam ships of war, and the money was placed in the hands of the American minister, Hon. Robert H. Pruyn, with discretionary power of using it as he thought best. The commission was intrusted to Thurlow Weed and R. P. Lansing, of Albany. Captain J. J. Comstock, assisted by Engineer Jesse Gay, formerly of the navy, has had the general superintendence of construction.

The first of these vessels, the *Fusiyama*, has just sailed for Japan. Her dimensions are as follows:—Two hundred and eight feet long, thirty-four feet beam, fifteen feet depth of hold, and measures one thousand and sixty tons. Her model is similar to our swiftest clippers, quite sharp forward, with good bearings amidships, and a full round stern. She had two masts, and what is called a full brig rig. She is built of white oak, locust and chestnut, thoroughly strapped and fastened; every bolt and piece of iron in her galvanized. She has five tiers of keelsons

and five bilge streaks, the former fourteen by fifteen inches; keel fourteen by twenty inches; garboard streaks six by fourteen inches; planking from four to five inches thick; ceiling four and a half between and five and a half inches thick below deck, varying from nineteen to seventeen inches in thickness—all of solid oak. Her hatchcombs, skylights and other parts, usually of oak, are of mahogany.

The style and finish, the furnishing and fitting up of the Captain's cabin is good enough for the Emperor himself. The style and color of the doors, ornaments, etc., is like that of the Japanese temples. The wood used is our well-known curl maple and black walnut, highly polished and finished. Here, as in every part of the ship, everything is done to conform to Japanese taste as much as possible. The cabin is located in the after part of the ship, is good sized, and contains one bathing and two staterooms; the former being regarded by the Japanese as the greatest of all luxuries. The cabin and staterooms are handsomely furnished and fitted up. The crockery is pure white, with a light gold streak and crimson band round the edge; on each piece is marked the ship's name in Japanese, which resembles the characters on Chinese and their own tea-chests, and other articles of the ship are marked in the same way.

The armament of the *Fusiyama* consists of one 100-pounder and three 30-pounder Parrott rifles, four 9-inch Dahlgrens, and four 24-pounder brass smooth bores—in all twelve guns.

The gun-carriages are of solid mahogany, brass mounted. Great care was taken to use only the best materials; the carriage of the 100-pounder cost \$5,000.

She is also well-supplied with the smaller necessities of war, such as Sharp's rifles, revolvers, cutlasses, etc. Her magazine is of ample dimensions for carrying eight to ten tons of gunpowder. In addition to the ship's armament, she carries over six artillery field-pieces, gun-carriages and all the equipments, five boats, beside a quantity of shot and shell. Her ground tackle is ample and sufficient, being a double outfit of anchors, chains, cables, etc. Her cost was \$500,000.

On the stern and bow are carvings and paintings of Japanese characters. The figure-head is that of a flying dragon. On her stern is a painting of the mountain, *Fusiyama*, and several smaller mountains. The carvings represent Japanese plants, flowers, birds, the stork, and the tortoise—the former emblematic of purity; the latter, longevity. These last two characters named are the national emblems, to be seen carved and painted on every thing public or private.

On the completion of the *Fusiyama*, last fall, it was the intention of the commissioners to have dispatched her immediately to Japan; but in consequence of the then existing difficulties with some of the treaty powers and that country, our Government detained her until harmony was restored. That having been done, she now departs, with the approbation of the United States Government, for her destined home, there to assume her character, and bear the imperial flag of Japan. She will be commanded by Captain Franklin Hallett, an old, experienced veteran of the China and East India trade.

Her crew will consist of a captain, three mates, one surgeon, one chief engineer and three assistants, one captain of boats, gunner, sailmaker and carpenter. The other two ships will be commenced shortly by the same builders.

## Nantucket "Tips."

A correspondent of the *Plymouth Rock* says:—"The Nantucketers have the funniest vehicles one ever laid eyes on. They are called tips; have two wheels, a box some six feet long, and no seats. They will hold some half dozen people, every one standing and holding on to a rope attached to the side of the box. The beach is at least a mile from the hotels, and many of the guests are forced to use this droll conveyance. I can't say much for its comfort, but it has the merit of novelty, and the ladies rather enjoy it. Imagine a string of these vehicles filling down the road, filled with women and children, dressed in the bizarre costume of the sea, innocent of etiquette, oblivious of social distinctions, caring not a fig how they look or how much fun their pedestrian male companions make of them."



# Queries

P. M., of N. Y.—Astronomers generally attribute the faint illumination of the disk of the new moon to reflection of light from the earth. Why a razor cuts better for being dipped in hot water we do not know. Does it cut better?

J. B. P., of Mass., and J. N., of Wis.—An explanation of the ball and jet similar to yours has already been published.

P. M., of Va.—You will find the catenary curve fully discussed in Davies & Peck's Dictionary of Mathematics, and in most works on geometry.

H. L. W., of Mass.—We think that a limited patent can be had on your reel.

J. H. M., of N. Y.—Your device for making a stream of water run itself up hill, is, like other perpetual motions, impracticable.

W. B. S., of Mass.—A large deposit of a good quality of plumbago, so situated that it could be easily quarried, would be of great value; there is a large demand for it for crucibles, pencils, and other purposes.

G. W. P., of N. Y.—Your law of the relative distances of the planets is beautiful, and it would have spread your fame throughout the civilized world if it had been true, but it is not. According to your diagram the secant of  $45^\circ$  of Mercury's orbit would give the radius of that of Venus. Or, by the 47th proposition of Euclid, twice the square of Mercury's distance from the earth would be equal to the square of that of Venus. The distance of Mercury is 37,000,000 miles, and of Venus 68,000,000; by making the calculations you will see that your law does not hold.

J. G. P., of N. Y.—Henry C. Baird, of No. 406 Walnut street, Philadelphia, will furnish you with a work on plumbing.

T. McD., of N. Y.—Your sketch of a condensing engine without an air pump will appear in a short time. We thank you for your courtesy in sending it. Write again.

J. H., of N. J.—Your inquiry for a spring to drive a fan-blower, to raise 300 pounds of water, (or tons; we cannot make out which) two feet high, in five hours, is unintelligible. We do not know of any spring that will do this.

J. S. L., of Md.—You must lay your request for a place in the Naval School before the Member of Congress from your district.

H. C. B., of Ohio.—Of two gages, one at the top and the other at the bottom of a boiler under steam, the bottom would show a pressure exceeding the top by the weight of the column of water above. The pressure of the atmosphere is equal to sustaining a column of water 34 feet high, therefore every two feet of water in depth in the boiler would add about one pound to the pressure on the gage.

E. F., of Cal.—We advise a preliminary examination at the Patent Office. There are so many plans for surface condensers that we cannot say whether yours is novel or not.

L. A. J., of Mass.—Smee's Electro-metallurgy is considered a standard work on the subject, though there have been some improvements in batteries since it was published.

R. T., of Pa.—The ports of your cylinder are ample for the bore and stroke.

L. R., of Mass.—The question of belting and power required to drive machines has been fully discussed in this paper. We must refer you to back numbers.

J. H. P., of Texas.—You can buy water rams at any agricultural warehouse; they are manufactured by Thomas Hanson, No. 291 Pearl street, in this city. They are the cheapest and simplest apparatus you can have for raising water. If your supply of water is not abundant we would suggest a windmill for pumping it up.

H. R. G.—No person has a right to use a machine in any county without first obtaining the consent of the owner of the patent for that county. The validity of the patent deeds is not effected unless the same territory has been sold to some one else. Put the deeds on record without delay.

W. J. P.—The *Southern Cultivator* is published at Augusta, Ga.

## 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 inclosing \$1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1863, to accompany the claim, on receipt of \$2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

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

**INVARIABLE RULE.**—It is an established rule of this office to stop sending the paper when the time for which it was pre-paid has expired.

## Back Numbers and Volumes of the "Scientific American."

VOLUMES IV., VII., XI. AND XII., (NEW SERIES) complete (bound) may be had at this office and from periodical dealers. Price, bound, \$3.00 per volume, by mail, \$3.75 which includes postage. Every mechanic, inventor or artisan in the United States should have a complete set of this publication for reference. Subscribers should not fail to preserve their numbers for binding. VOLS. I., II., III., V., VI., VIII., IX. and X., are out of print and cannot be supplied.

# Correspondence

## Seasoning Lumber.

MESSRS. EDITORS:—I notice on page 85, current volume, of the *SCIENTIFIC AMERICAN*, an article, signed "Anthrax," on seasoning of lumber, by which I perceive it to be more and more evident, as I said in a former communication, that the matter of seasoning and drying lumber is very imperfectly understood.

"Anthrax" mentions the Hungarian mode of seasoning out the albumen by common escape steam, then plunging the lumber into ice water, and afterward drying it in a close room, which, of course, immediately becomes a steam chamber, provided there is any moisture remaining in the lumber which can be changed into steam.

This placing the lumber in ice water is a regular hocus-pocus, for all the object to be gained by it is to prevent the closing of the pores of the lumber on the outside while going through the farce of changing the lumber from the common steam to the steam drying room. And even in that case common cold, warm or hot water would answer just as well, while it would be far better to leave the lumber in the first steam room, and apply heat to it, so as to preserve a steam atmosphere by steam generated from the drying lumber, which steam excludes the air and prevents closing the pores on the outside until the moisture has passed out of the center.

It seems, however, the Hungarians had the idea that lumber must be seasoned as well as dried; and in that respect they were in advance of many would-be wiser persons, who suppose that drying of lumber is also seasoning it. Lumber may be dried and not seasoned, or seasoned and not dried. It needs both as much as either, for most kinds of uses. To season lumber is to deal with its albumen; if this albumen is soaked, boiled or steamed out, the lumber is seasoned, though the loss of the albumen diminishes its strength and durability, as well as the beauty of finish of all lumber and timber. When all the strength and beauty of the lumber is desired, the albumen should be coagulated and retained in the pores of the lumber.

It is well known to scientific men that when wood dries the sap retires toward the center, carrying with it the albumen, while the aqueous portion is evaporated. This albumen follows the medullary rays to the heart wood, and when once dried and again wetted it swells with an uncontrollable force, which checks or bursts the stock. The starch contained in this sap changes to acetic acid as soon as it comes into contact with water or a moist atmosphere, and erama-caus, or dry rot ensues.

The proper way, therefore, is to coagulate this albumen, so as to make it insoluble in cold water, and still leave the albumen in the pores of the lumber, where it belongs, and where its presence is as valuable as paint for its preservation, or as pumice stone or shellac to make a smooth or finished surface.

It is evident that "Anthrax" has a very imperfect idea of the American patent mode, as he calls it, for seasoning and drying by superheated steam. He seems to confound superheated steam made under high pressure, requiring strong and expensive boilers—the use of which, he says, is one of "great delicacy," with the new mode, by means of which a much higher degree of heat may be obtained than would be practical or safe when made under pressure; and yet the new mode requires no greater pressure than will just balance the pressure of the atmosphere, requiring no expensive apparatus; no safety valves, and not even a steam boiler, and with the whole apparatus and its management so simple that any boy that can build a fire and read the thermometer can work it perfectly. Besides, where steam is superheated in particles, as in the new mode, the heat can be applied so as to obtain any kind of an atmosphere desired, from 100 to 1,000 degrees or more. In fact, this kind of steam is now used to melt iron, and exceeds all other modes for that purpose, both in economy and in the quality of the iron produced.

By the new mode of seasoning and drying I placed 9,000 green gun stocks in a kiln say 16 by 24 feet,

at one of the large armories, and then took six of the stocks as samples of the remainder, and gaged each stock into  $\frac{1}{4}$ th of an inch, and weighed them in pounds and ounces. Each 24 hours, or day, these stocks were separated, re-weighed and gaged, to ascertain the daily progress in drying and shrinking. If necessary, I can furnish the weight and gage of each stock, but will at present give the result of the six stocks combined, to wit: The first 24 hours they lost in weight 12 pounds and 13 ounces, or 2 pounds and  $2\frac{3}{4}$  ounces each, which, if applied to the whole 9,000 in the kiln, would show over 19,000 pounds of water removed during the first 24 hours. The second 24 hours the six stocks lost 5 pounds, 5 ounces; and, by continuing the fire 12 hours longer, they lost 2 pounds, 13 ounces.

During the first 24 hours the combined gage of the six stocks was diminished  $\frac{3}{4}$ th of an inch; second 24 hours,  $\frac{2}{4}$ th of an inch; last 12 hours, none; thus showing that by this process the shrinking is all completed before the drying is all done, while the seasoning and drying occupied only  $2\frac{1}{2}$  days.

There is no necessity for drying any lumber after the shrinking is all completed. It is worthy of note, however, that in the finishing of these stocks it was ascertained that the usual wetting of the stock after the first finishing did not raise any grain on the wood thus showing that the seasoning, as well as the shrinking, was performed in the same kiln in  $2\frac{1}{2}$  days, while the albumen was so thoroughly coagulated as to become practically insoluble in cold water.

I have extracted at the rate of over 1,900 pounds of water from 1,000 feet of green lumber, as a part of a large kiln, in four days.

H. G. BULKLEY.

Cleveland, Ohio, Aug. 17, 1865.

## Castor Oil as a Lubricator.

MESSRS. EDITORS:—On page 83, of your paper, you say nothing can be worse for machinery than castor oil, as it gums badly, etc. I never used it myself, so I cannot speak from personal knowledge, but three or four months ago a Santa Fe trader, who had crossed the plains "twenty times" with trains of wagons, assured me that he found castor oil to be the best lubricator he had ever tried for wagon axles. On a bystander remarking that he thought it would be too dear a material for this use, the freighter answered, that it lasted so long without thickening, and so little was required, that it was the cheapest in the long run. "I only oiled three times between Santa Fe and Leavenworth, and my axles were as cool and clean the last day as the first." This was his testimony. I use lard oil for machinery and patent grease for wagon axles.

By the way, why don't the inventors get up a convenient way of oiling wagon and coach axles so as to relieve us of the necessity of "jacking up" heavy vehicles? Why not have oil cups back of the hubs leading down on to the axle? I have tried perforations through the hubs and axle boxes, but the centrifugal force defeated me. The oil reservoir must be stationary, and not revolve, and be some distance above the axle. It is true that farmers are not prone to lubricate sufficiently. They are usually careless of machinery.

EDWARD M. RICHARDS.

Mound City, Kansas, August 20, 1865.

## A Question of Pressure.

MESSRS. EDITORS:—If 30 lbs. of steam is all that is required to run an engine comfortably, is it a waste of fuel to carry 50 lbs? It seems to take more water to carry 50 lbs. of steam than 30 when there is only the same amount of steam used.

L. J. L.

Sandwich, Ill., Aug. 31, 1865.

[It takes twice as much water to make a quart of steam at 60 lbs. pressure that it does to make the same volume at 30 lbs., therefore there would be a waste of fuel in using a given volume of steam at 50 lbs. pressure instead of 30 lbs. But if your boiler will bear 50 lbs. with perfect safety, you would probably find it economical to work your steam at that pressure, cutting off short enough to get only the power that you need. From the great mass of experiment and discussion in regard to working steam with different measures of expansion, the one truth that seems to be emerging is, that it is economical to use steam at high pressure.—Eds.]



**A Suggestion in Raising the Cable.**

Messrs. Editors:—Those engaged in laying the Atlantic telegraph cable, after being so fortunate as to grapple the broken line three times, lost the fruit of their labors on account of the very circumstance upon which, a few days before, they were congratulating themselves, viz., the very small amount of slack run out. This only amounted to 14 per cent. In every 14 miles run there would be 16 miles of rope—2 miles of slack. If it could be brought to the surface in water  $2\frac{1}{2}$  miles deep, at a single lift, there would be about 13 miles of cable hanging by a single point—about  $6\frac{1}{2}$  miles on either side. If I remember correctly, the cable was only calculated to sustain 11 miles of its own length in water, so that there would be 2 miles to be lifted beyond the capacity of the cable. Besides, the slack, being pretty evenly distributed over the 12 or 13 miles, part of the cable would have to be dragged on bottom to make it available. It would seem, then, that neither the cable nor the grappling ropes could stand the strain that would be put upon them.

I think that the operation of raising would be far more likely to be successful if made thus:—Suppose the cable grappled at joint, B, and raised only half way to the surface, and made fast to a buoy; then grapple cable again, about 10 miles off, at point, C, raising, as at B, and attaching a buoy; then by grappling at A, between the points, the cable would be brought to the surface with very little strain compared with the strain of raising it at one lift.

This is a mere speculation, the truth of which the next news from Europe may or may not confirm. It would be presumptuous, to say the least, for any one to affirm positively that it cannot be brought to the surface at one lift—but it does not seem probable; however, if any one, ten days ago, had said that the lost cable could be successfully grappled for in water  $2\frac{1}{2}$  miles deep he would have been considered very visionary.

CABLE.

Philadelphia, Aug. 19, 1865.

**A Question of Levers.**

Messrs. Editors:—We have a question under discussion here relative to two levers, namely, which of the two levers will raise the greatest weight with the same power? The first lever is three feet long; the fulcrum is at the end of the lever, and the weight one foot from the fulcrum. The other is the same length, and the weight is at the end of the lever, the fulcrum one foot from the weight. I contend there is a difference.

O. CARMAN.

Union, Ill., Aug. 29, 1865.

[In both levers the short arm is one foot in length, but the long arm of the lever which has its fulcrum at the end, is four feet in length, while the long arm of the other is only three feet, consequently three pounds applied to the former will raise as much as four pounds applied to the latter.—Eds.]

**Croton Bugs and Cockroaches.**

Messrs. Editors:—Each returning summer finds these pests on the increase, and they seem to laugh at "pyrethrum" or other poisons. Allow me to state in your paper this fact, which is but little known, viz., powdered borax sprinkled liberally where they most do inhabit is a dead shot on them. I account for it in this wise, that the borate of soda being a sweet alkali is, like St. John's little book, "sweet to the mouth and bitter to the belly."

ALEX. SHELTON, Chemist.

Buffalo, Aug. 28, 1865.

**Origin of Petroleum.**

Messrs. Editors:—Soon after the petroleum discovery in Pennsylvania, I suggested that, instead of this product having its origin from coal, the reverse was the more probable process; more in accordance with the usual operations of nature, which generally adopt the simplest and most direct means for obtaining a given result, and not, as has been taught in this case, the most roundabout way that could be conceived of.

Suppose, and it is not an unreasonable supposition, that down in the subterranean caverns of the earth, the salt water should come in contact with beds of graphite or carbonized iron. By the operation of double elective affinity, the oxygen of the water might

combine with the iron, and the hydrogen with the carbon, the latter combination forming the carburated hydrogen gases, which, by the immediate pressure of constantly-forming gas, would be condensed in underground caverns as oil. This is a straight-forward and simple process, and is, to say the least, feasible. We are not very well acquainted with the internal chemistry of the earth, but we have occasionally pretty strong evidence of its activity. The sudden production of a large quantity of this gas might account for earthquakes.

Whether coal could be derived from petroleum would require more investigation than I have given to the subject.

W. F. QUINBY.

Wilmington, Del., Aug. 27, 1865.

[It is generally considered more probable that neither coal nor petroleum was produced from the other, but that both are the products of organic decomposition, the difference in the results being due to the different conditions under which the decomposition took place.—Eds.]

**THE DISASTER TO THE CABLE.**

On the 2nd of August the cable parted and went overboard in nearly 2,000 fathoms water, 1,062 miles from Valentia. The cause of this sad accident arose from the discovery of a fault and consequent hauling in of the cable, and the very imperfect engine used for the purpose. Who would have supposed that an engine specially provided to perform that very important work would be in such a disgraceful state? "Eccentric gear out of order, so that a man had to stand by with a handspike, aided by a wedge of wood, and an elastic band to aid the wretched engine. Next the supply of steam failed, and when the steam was got up it was found that there was not water enough in the boilers, and so the picking-up ceased altogether for some time, during which the ship forged ahead, and chafed against the cable. Then occurred the great misfortune." Of course it did; it would require a most wonderful cable to withstand such playing with in 2,000 fathoms water with one end held to the bow of a vessel that was continually rising and falling and chafing against it. We wonder it did not part sooner and fly overboard. Whatever distance the bow of the *Great Eastern* rose and fell when the cable was fixed at the bow, and not being hauled in, that same length was allowed for by the cable stretching, for it was impossible that it could be absolutely lifted, in the time of the rise, from the bottom, or for a length of 2,000 fathoms. We almost question if the strain was felt at the distance of 1,000 fathoms, for the friction of 1,000 fathoms of cable in water, when moved with the same speed as the rise of the bow of the vessel, would be enormous.

It is almost certain that the main "faults" were caused by the stretching of the spiral spring, and consequent opening of insulating material and disruption of the copper core. Hauling-in ought never to be required, for it is a most dangerous operation with any cable in great depth of water, and where the surface is not as smooth as a mill pond. Such hauling-in would not have been required had the cable been made with the sustaining wires parallel with the axis, and therefore parallel with the copper core; then the copper wire, being the most ductile, would always have accommodated itself to the extension from strain of the iron covering wires; they, being straight and of iron, would naturally break before the copper core could be injured in the slightest degree. Thin wires wound round the straight sustaining wires would bind them together on the insulating material as perfectly as could be desired. The arrangement for hauling in from the bows of the vessel was a great mistake. What an amount of hazard and care would have been avoided had the hauling-in apparatus been fixed at the stern—either by itself and parallel to the paying-out machinery, so that the cable would simply have required lifting out of the groove of one wheel into the other, or, as Captain Anderson recommends, having an engine applied to the paying-out gear so as to reverse and haul in at once, while the fault was being located. Such an arrangement would have greatly reduced the risk of completely losing the cable—not, however, with such a faulty engine as was used at the bow of the vessel.

As to fishing up the cable from a depth of two miles and a half, or two miles of water, the chances

are very vague. If in a distance of nine hundred and forty-eight miles only one thousand and eighty-one miles of cable were payed out, there is not much slack left for the successful picking up. Presuming that the cable was laid hold of at the depth of 2,000 fathoms, and presuming the fishing tackle to be amply strong for any strain—what would be the consequence to the cable? Why, it would break long before it was brought to the surface. When it is considered that it is laid in nearly a straight line, there being so little slack, the strain on itself from its own weight would be very great when lifted only one mile from its present resting place. Assuming that in the length of about four miles of cable the length of slack is half a mile, the center of four miles and a half being lifted up one mile, the strain on the cable at the highest point would be equal to three miles of its own weight on either side of the fishing tackle; beyond this strain, there is the strain due to the friction of pulling it through the water. If it is strong enough to withstand the above strains, how much higher could it be lifted? In lifting it higher the cable must either stretch, or be dragged along the bottom of the ocean beyond the distance of two miles on either side. Even supposing the curve of the catenary to be flatter than we have assumed, the consequence would be a proportionately increased strain on itself at its highest point, due to an increased length suspended at a more acute angle with the horizon. It thus appears impossible to lift the cable safely out of this great depth of water—especially when we consider that experiments have been made which gave a result showing that, in great depth of water, the strain with equal velocity is increased to four times when the length is doubled; and, in addition to this, it must be remembered that the friction is increased as the square of the velocity.

Our only hope of regaining a portion of the cable is by fishing it up in shallow water, and carefully, and slowly, underrunning it in very calm weather. No doubt there are many enterprising men who would undertake to underrun it at a certain sum per mile, and it might be to the interest of the company to accept any reasonable offer to that effect. We regret, however, that nothing more can be done towards picking it up and completing it this year. Early next year we hope to see this cable underrun for a considerable distance, a connection safely made, and a complete cable in perfect working order, resting on the bed of the wide Atlantic. It may be advisable at the same time to lay another cable of such specific gravity that it would slowly sink to the bottom of the ocean. Such a cable would have but little strength, and must therefore be of such a quality that it would by no chance whatever require hauling in. It will be a proud day for Englishmen when this important work is successfully completed.—*Mechanics' Magazine*.

**Sheathing Iron Ships.**

Among the numerous plans for rendering the bottoms of iron ships proof against fouling, is one by Mr. Mulley, Lloyd's surveyor at Plymouth. It consists in completely incasing the ship's bottom with wood to a considerable height above the deep load-line, and then covering the wood with a sheathing of yellow metal in the same way as the bottom of a wood ship is sheathed. This method of treatment he applied to the *Iron Gem*, which is now in the Clarence Graving Dock for inspection, she having just returned from a voyage to the Brazils. The outer metal sheathing is smooth and clean, not exhibiting even a wrinkle, while, by the ingenious yet simple mode in which the wood casing is secured to the hull, no metallic contact is possible between the iron of the ship and the yellow metal or any of its fastenings, and by this arrangement galvanic action is completely prevented.—*Mechanics' Magazine*.

[Wet wood is too good a conductor of electricity for this plan to work.—Eds. Sci. Am.]

We know that the attraction of the whole earth gives to a body near its surface a velocity of 32 feet in a second, and by comparing the masses and distances from the center of the earth, and a globe of the same density and a foot in diameter, we can easily calculate the velocity the latter would give a small body near its surface. The velocity thus determined is less than an inch in a year.



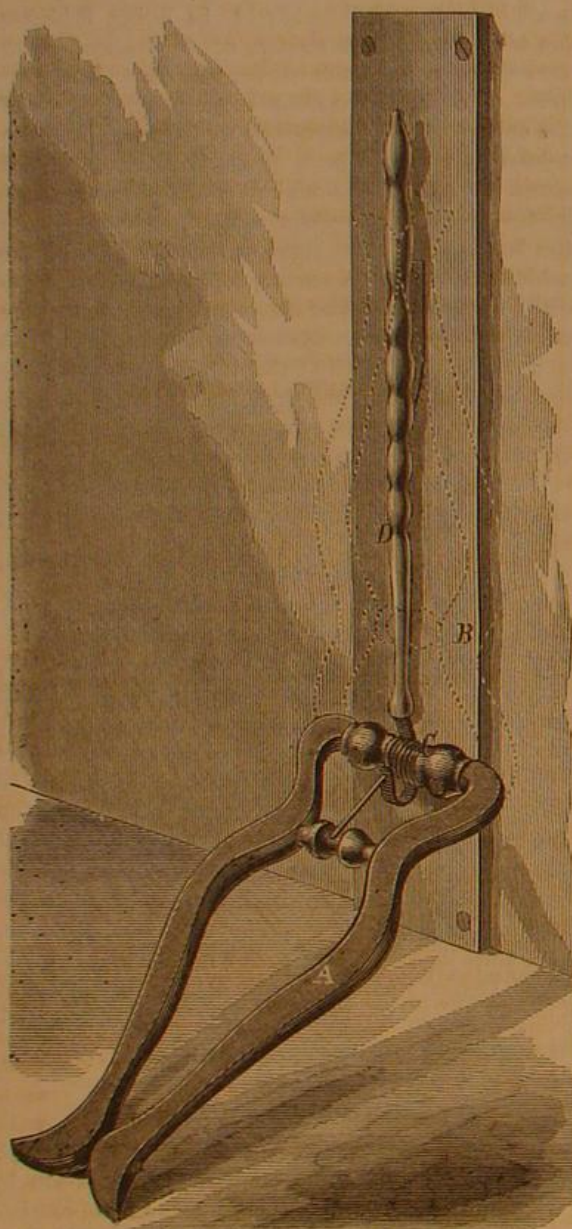
## RICHARDSON'S BOOT-JACK.

We have read, in some recent publication, of the highly reprehensible conduct of an individual who, on slight provocation, threw a boot-jack at his servant. This occurred partly because the individual was demoralized, and partly because the boot-jack was lying around convenient; but had it been properly constructed it would never have been the terror of a guilty party or the innocent instrument of wrath.

This boot-jack cannot be thrown at people's heads—it cannot be lost, estrayed or stolen; if it is, the thief must take the wall of the house too, for it is fast thereon.

This boot-jack is designed to remedy the inconveniences which are common to the old one, such as being mislaid, and not to be had at the proper time.

It is fastened to the board, A, which in turn is screwed to the wall of the room where the boots are drawn off—as the kitchen or bed-room. In con-



struction it is simply a jack, A, hinged to the board, B, and fitted with a spring, C, which holds it upright when not in use, as shown by the dotted lines. At D there is a handle with a leather strap; by lifting this when the jack is up against the wall, the jack will be let down, as in the engraving, all ready for use. It is not in the way, and is a convenient thing. It was patented June 19, 1864, by M. A. Richardson.

For further information address Richardson's Patent Boot-jack Co., Sherman, Chatauqua County, N. Y.

## EYE SERVICE.

There is nothing more humiliating to a right-minded person than to be watched. There is nothing more annoying to an employer than the spectacle of men hard at work in his presence, but idle, or dilatory so soon as his back is turned. A man who is desirous of earning his wages works at all times during business hours, but one whose chief anxiety is to draw his salary, is better out of the way than in it, and is, moreover, dishonest.

Whether the engagement be for one year or one week, the agreement, on the one hand, is to pay a certain sum for the services of an individual; on the other, to work faithfully and honorably for the said

term. What would be thought of the employer who should, on pay-day, withhold a portion of the salary by reason of the contract not being kept by the workman. He would be universally condemned as mean beyond precedent, but is there any more justice or honor in frittering away an employer's time, or deceiving him by a pretended performance of work, than in withholding an employee's salary? None at all. Labor is honorable, and the man who works for his living, whether with a pen or a hammer and chisel, is to be respected, but no one respects a man who is constantly trying to evade his duty, and if he is held in low esteem, he alone is responsible therefor.

## French Mode of Making Butter.

A prompt and easy means to manufacture butter is to put the cream into a sack of linen, neither too thin nor too thick; tie the sack and place it in a hole in the ground fifteen to twenty inches in depth; cover the hole, and leave the cream for twenty-five hours; take out the cream, which is very hard, and pound it with a wooden pestle to separate the butter; pour on a half glass of water and the butter separates from the butter-milk. It is an affair of two minutes.

If the cream is in large quantity it is necessary to leave it more than twenty-five hours. In winter, when the earth is frozen, the operation may be made in a cellar with sand. This process never fails. In Normandy and Berry, butter is made in no other way, for not only is loss of time avoided, but the cream yields a larger per cent, and the butter is excellent.

Some persons inclose the sack of cream in another sack to avoid putting the earth too nearly in contact with the butter.—*La Science Pour Tous*.

[We translate this from our cotemporary as a matter of curiosity, and if any of our readers try the plan, we should like to hear the result. Cream is so extremely sensitive to all odors and flavors, we should suppose that if buried in the ground it would be very certain to contract an earthy taste.—Eds. Sci. Am.]

## How Silver is Extracted from Quartz.

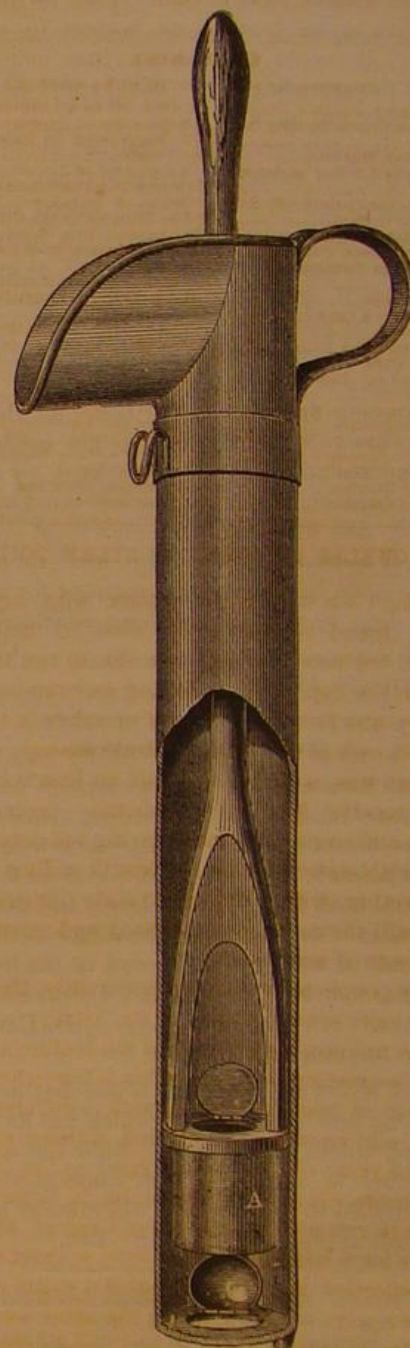
A correspondent of the Boston *Advertiser*, writing from Virginia City, Nevada Territory, gives the following interesting account of silver mining:

"After the quartz has been extracted from the mine, it is taken to the mill, broken in pieces of from half a pound to two pounds in weight, thoroughly dried by the application of heat, and then crushed to powder in the mill. Various machines are advertised for crushing quartz, which their inventors and proprietors say will accomplish great results, but none of them are yet in practice and successful use at Reese River. The process universally resorted to in Nevada is the old stamp mill. This process is simply the dropping of heavy weights upon the quartz, which is placed in dies prepared to receive it. Five stamps are usually arrayed side by side, weighing from five hundred to seven hundred pounds each. They are raised a distance of from eight to ten inches, and dropped from sixty to eighty-five times a minute. A wire sieve is placed upon each side of the dies, through which the powdered quartz escapes into a receiver, from which it is taken to a furnace, where it is subject to the action of a stream of flame from five to eight hours, during which time it is constantly stirred. As this flame carries off some silver bodily, it is made to pass through a long chamber, and exposed to cooler air before reaching the chimney, so that the silver can be saved. After being roasted, the pulverized quartz is ready for amalgamation. At the Midas Mills, which is considered to be the best mill at Reese River, the amalgamation is done by the Freiberg barrels, into which loose and irregular pieces of iron are placed for the purpose of mixing the quicksilver with the pulp (as the pulverized quartz is called), and which are then revolved over and over. In other mills, the pulp is put into tubs, and stirred in water for nearly an hour, and then the quicksilver is applied, and the mass is stirred by means of iron flanges for three hours. About seventy-five pounds of quicksilver are allowed for one thousand pounds of pulp. After this the water is drawn off, and a process like the distillation of cider brandy is resorted to for the

purpose of saving the quicksilver, and the amalgam, composed of silver and quicksilver, is squeezed to get out the quicksilver, after which it is put in the retort, and upon being subjected to heat, more quicksilver passes off in fumes, and is saved, and the crude bullion which is left is ready to be taken to the assay office. This is substantially the process used at Reese River, where dry crushing is necessary, on account of the presence of baser metals. In Virginia and vicinity, where the ore is of a different character, and far less rich, it is crushed wet, and the expense is much less."

## RICHARDSON'S CREAM PUMP.

It is well known to butter makers that cream kept for a few days loses a portion of its water and



becomes curdled when exposed to the air. If churned in this condition the butter resulting will be poor in quality and full of fragments of the curds which have not been reduced; these not only render the butter unsightly, but greatly depreciates its quality.

This pump is intended to divide and subdivide every particle of curd thus formed, and to render the whole as smooth as if just skimmed from the milk. In construction it is an ordinary pump, furnished with a bucket and valves, as usual. The lower part of the bucket, however, is surrounded with a gauze strainer, A, through which the cream must pass before it can get out. It is on passing through this strainer that the cream is reduced as specified and rendered fit to churn immediately. It is also easily cleaned, and not cumbrous to use. The patent was reissued through the Scientific American Patent Agency, March 17, 1863. For further information address Richardson & Keeler, Sherman, N. Y.

**COLORS ON INDIA-RUBBER.**—The *Druggists' Circular* says:—"The surface of the object is covered over with a thick solution of caoutchouc in turpentine rubbed up with white zinc, and when this is thoroughly dried, the color which it is desired to apply is put on mixed with turpentine."



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## TROUBLES INCIDENT TO STEAM BOILERS.

"I don't see what is the matter with my boiler," said a friend recently, "it used to make steam enough, but now it is all I can do to run the engine through the day." Upon having an examination, the mystery was found to consist of ashes in the smoke box and soot in the tubes; simple enough, certainly. The cure was, a shovel and half an hour's labor.

We receive frequently elaborate descriptions of boilers and engines by mail, giving full dimensions of each, with statements of the length of time they have run together, with a request to state (generally by return mail) the cause of their decay and general failure after years of service.

Many people have an idea, apparently, that a steam engine loses some portion of its vitality every year in some unknown way, so that its decline and fall is simply a question of time. This is true where no care is taken of machinery, but, with intelligent supervision, and repairs when needed, a steam engine one hundred years old will be as good as the first day it took steam. It is as unreasonable to expect a steam engine to run continually without repair and inspection, as for a human being to exist without eating. A little reflection would show that if a steam engine has run for a term of years, doing the same work continually, the failure, if there be any, arises from natural causes, and that examination of it by a competent person would be the course to adopt.

It often happens that shafting gets out of line in a shop, and that the machines generally are disordered in their relation with the power which drives them. Where this is the case, lining up the shafting and setting up the machines again would effect a great saving of power and fuel. It also happens that boilers sometimes give out, or cease to make steam freely, from the destruction of the draught.

If one building be erected by the side of another the draught of the chimney will be affected when the wind is in a certain direction, and this in spite of the general cleanliness and good condition of the boiler. The remedy for this is to increase the height of the chimney or put in artificial draught.

It is also frequently the case where pine wood or bituminous coal is used for fuel that a resinous deposit forms on the inside of the tubes, to the very great detriment of the steaming qualities of the boilers. It is extremely difficult to remove this, as it is composed of soot and resin, and adheres to the iron with great tenacity. A whalebone brush is sometimes employed; also a brush made of steel wire, but these instruments merely scratch the surface of the deposit without removing it. It has occurred to us that a strong,

hot solution of potash might be used with good effect in this case, and we recommend a trial of it at least. It cannot hurt the boiler externally, and is so easily tried that it should be.

Another acquaintance, some time since, called our attention to his boiler and engine, the boiler failing to make steam sufficiently, although in size it was ample. The defect here was in the setting. The boiler, an ordinary cylinder, was set on top of two brick walls, as the cover would be laid on a box, and the fire-place was simply a gaping cavern, in the further end of which the throat of the chimney loomed wide and voracious. If all the heat of Vesuvius in eruption were turned under the boiler it would hardly make steam enough in its condition. The steam would have been made in the chimney, for that was where the heat went, and its effect on the boiler seemed more like a passing favor than any actual duty it was bound to perform. When the furnace doors were opened a roaring wind passed through them, and the blaze went far up the chimney. The remedy in this case was to lessen or obstruct the draught; to add a bridge wall five or six feet from the furnace door, and to put a damper in the chimney, so as to arrest the heat when desired.

But lately we received a letter from a party desiring to be informed what size engine a boiler of certain dimensions would drive. He added, on closing, "If the boiler is not large enough it can be lengthened." Not large enough for what? the engine it would drive? This seems like a hasty inquiry.

As has been recently pointed out, the field for improvement is very wide. The proportion of heat utilized to that driven off or lost is very little—hardly one-tenth—and this waste is going on continually. Of course the quantity differs in different boilers, and can be greatly lessened by good management, but that great slovenliness in the use of fuel, and great indifference prevails on the part of proprietors toward getting competent engineers to attend their boilers, is apparent to any intelligent observer.

## THE CORN SUGAR PATENTS.

The patents granted to Frederick W. Goessling and his assigns for a process of making sugar from corn and beet roots, are at last issued, and copies may now be obtained by parties desiring them. The unprecedented price for which these patents were sold, and the quantity of matter that has been published in relation to them, has created a wide interest in them; the following brief statement, therefore, of their leading features will doubtless be acceptable to many of our readers:—

On the 10th of May, 1864, two patents were issued, one for a process of making sugar from corn and beet roots, and the other for the sugar thus produced as a new article of manufacture. The specifications describe, first, a process of washing the starch out of corn, then a process of converting this starch into grape sugar. It is the well-known process of steeping the starch in very dilute sulphuric acid, with some slight modifications, one being the introduction of "the extract of potato eyes." Then a process is described of extracting sugar from beet roots. Before granulating the two sirups are mixed together, and after the mixture the sugar is granulated and drained.

It will be seen that the most important feature is the mixture of the two kinds of sugar—the grape sugar, made from starch, and the cane sugar, extracted from the beet root—this mixture being made before the granulation. What virtue there may be in "the extract of potato eyes," and in the other modifications of the modes at present employed for converting starch into sugar, we do not know.

On the 20th of December, 1864, a third patent was granted for a compound sugar made by mixing the sirups of cane sugar and grape sugar, by whatever process these sirups might be produced.

It has been stated, positively and repeatedly, by men of the highest respectability, that the sum of six hundred thousand dollars in cash was paid for these patents; it is certain that the parties alleged to have made the purchase are abundantly able to pay this enormous sum.

## CLOSE WEATHER.

During the first days of September the heat has been more oppressive than in any part of the sum-

mer, though the temperature, as indicated by the thermometer, has not been as high, by several degrees, as in the warmest of the summer days. Why should there be at different times this difference in the relative effect of heat upon the expansion of mercury, and upon the sensations of the human system? The answer is, doubtless, to be found in the different hygrometric conditions of the atmosphere.

The temperature of the body is prevented from rising above 98° by evaporation. The heat of the system is generated by the slow oxidation—in other words, by the slow burning of the food, and, when it is generated too rapidly, the glands, by some mysterious action, are stimulated to secrete perspiration, which, as it comes to the surface, is evaporated, absorbing and rendering latent 1,000° of heat in the operation, and thus keeping the body cool. When the air is already saturated with moisture, the evaporation is obstructed, and hence the feeling of oppression.

Could the property of matter by which the glands are made to increase their action at 98° be discovered, it might be of great value in the chemical laboratory, and in many of the arts. The power of maintaining a constant temperature of 212° by the boiling of water, is now in daily use in all households, and the power of maintaining without variation a far lower temperature, might be of equally extensive application. It is probable, however, that this property belongs to matter only when organized in animal systems, and will, therefore, never be available to human art.

## A HEAVY LOCOMOTIVE.

The Jersey City Locomotive Works have recently completed a very heavy engine for the Atlantic and Great Western Railway.

This engine has some points of novelty in the general arrangement of the details, but the great weight of the machine, and the size of the cylinders, strike every one immediately.

The weight of the engine is 42 tons, of which 13,800 is on the two small wheels forward, and the remainder on the three pair of driving wheels. The wheels are four feet in diameter, and have Krupp's steel tires. The cylinders are 18 inches diameter by 24 inches stroke, and the steam ports to the same are 1 inch by 14 inches. The exhaust is 2½ by 14.

The drivers are connected, and have flanges on the tires, and the cross-head works on guides, above the piston rod. The guides consist of two steel bars, about 2½ inches square, and the cross-head has a bearing of nearly 20 inches on them. There are brass gibs fitted to the cross-head, but the wear of them is a source of trouble. The boiler has 180 iron tubes, about 12 feet long, and burns soft coal.

The tender weighs twenty tons, with coal and water. The water capacity is 2,000 gallons, and the coal 6,000 pounds. With this amount of fuel we are assured that the engine can run one division of the Erie Railroad, which, we believe, is 120 miles.

This engine is a fine piece of work, and does credit to the establishment where it was built. Twenty-six of the same pattern have been constructed for different roads. We are indebted to Mr. J. J. Barton, engineer of the Atlantic and Great Western Railroad, for these particulars.

## Fair of the American Institute.

We remind our readers that the great fair of the American Institute opens on the 12th of September. Unusual efforts have been made to have this the most extensive and interesting exhibition that the Institute has ever had. It is said that the display of moving machinery will be especially attractive, and will embrace a number of novelties. Full reports of the exhibition will be published in the SCIENTIFIC AMERICAN.

THE CHICAGO TUNNEL.—The distance now reached in the Chicago lake tunnel for the water-works is 3,500 feet, and the work is progressing at the rate of 17 feet a day; the authorities confidently expect a completion of this gigantic labor of tunneling the lake for two miles, and the accompanying works, by the close of next year. The city has over 129 miles of water pipe laid and in operation. The income from the water rates for the last fiscal year was \$224,902.





ISSUED FROM THE UNITED STATES PATENT-OFFICE  
FOR THE WEEK ENDING SEPTEMBER 5, 1865.

Reported Officially for the Scientific American.

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

#### 49,690.—Machine for Drawing Spikes.—Nathan Adams, Altoona, Pa.:

I claim the sliding stock, D, operated by the eccentric, E, and lever, F, or their equivalents, in connection with the jaws or nippers, C C, pivoted to the eye, b, on the guide rod, H, of the stock, all arranged to operate in the manner substantially as and for the purpose set forth.

[This invention relates to a new and improved device for drawing spikes, more especially designed for drawing railroad spikes, and it consists in the employment or use of a sliding stock, in connection with jaws or nippers and a lever, all arranged in such a manner that the desired work may be performed expeditiously and without bending or injuring the spikes, so that the latter may be again used.]

#### 49,691.—Machinery for Plating or Finishing Sheets of Paper.—Charles T. Bainbridge, Brooklyn, N. Y.:

First, I claim the flexible plates, I I', applied and operating in combination with a pair of pressure rollers, substantially as and for the purpose herein specified.

Second, The weights, E F F', attached to the ends of the flexible plates, I I', and operating substantially as and for the purpose herein specified.

Third, The combination of the flexible plates, I I', pressure rollers, B B', weights, E F F', feed board, n, and delivery board, p, the whole arranged and operating substantially as and for the purpose herein specified.

#### 49,692.—Sawing Machine.—N. B. Baldwin, Georgetown, Ill.:

I claim the combination of the guide rods, J J', and springs, L L, with the saw, K, and frame, D, as and for the purposes specified.

[This invention relates to a new and improved sawing machine for sawing wood transversely with the grain, and is designed for sawing logs into proper lengths for cord or fire wood, and also into proper lengths for re-sawing into lumber. The invention consists in a novel construction and arrangement of the saw frame, and in the application of springs to the saw for feeding the latter to its work.]

#### 49,693.—Road-making Device.—Thomas T. Barber, Hampton, Conn.:

I claim the combination of the two gangs of plows and the draft gear with the scrapers, when the whole is constructed and fitted for use substantially as herein described and set forth.

Second, I claim the combination of the scrapers with the harrow, when both are constructed, connected and fitted to produce the result of scraping and leveling, substantially as herein described and set forth.

#### 49,694.—Evaporating Pan.—H. F. Bartlett, La Grange, Mo.:

First, I claim the pan provided with flaring or inclined flanges, a, around the vertical sides, and with terraced bottom and partitions, arranged substantially as and for the purpose herein set forth.

Second, The side or scum chambers, E, the bottoms of which are a little higher than that of the pan communicating with any or all of the compartments of the same, substantially as and for the purpose specified.

Third, The transverse air tubes, F, placed in the upper part of the furnace underneath the pan, immediately in front of the sloping portions of the bottom, as and for the purpose specified.

[This invention relates to certain improvements in a sugar pan, which Letters Patent were granted to this inventor, bearing date Oct. 18, 1864. The invention consists in a modification of the construction of the pan, whereby the juice is prevented from boiling over; and also in the employment or use of a skimming chamber applied to any or all of the compartments of the pan, and in the application of air tubes and plates, to prevent the burning or scorching of the juice.]

#### 49,695.—Railroad Car.—A. Ely Beach, Stratford, Conn.:

I claim the employment of a cable-seizing device, constructed and operating substantially as herein shown and described.

#### 49,696.—Draft Cable for Railroad.—A. Ely Beach, Stratford, Conn.:

First, I claim the construction of the links of a draft cable, substantially as herein described.

I also claim the combination of the friction wheels with said links, substantially as herein described.

I also claim the serrated comb or back, constructed and employed as herein set forth.

I also claim the combination with a draft cable of a scraper, substantially as described.

#### 49,697.—Sliding Draft Cable for Railroad.—A. Ely Beach, Stratford, Conn.:

First, I claim the combination of a cable and a supporting surface, substantially as described, so that the rubbing surfaces will be protected by the cable.

Second, I claim the suspension of draft cables upon sliding ears or bars, substantially as described.

Third, I claim the combination of the supporting frames with the cable, substantially as described.

Fourth, I claim the construction of the wall or walls of the groove or channel in which the cable runs, with grooves and bearings to receive and support the cable or the case thereof, substantially as described.

#### 49,698.—Track for Railroad.—A. Ely Beach, Stratford, Conn.:

I claim the construction of tracks for railroads and draft cables, or for draft cables only, substantially as herein shown and described.

#### 49,699.—Mode of Transmitting and Delivering Letters, Packages, Etc.—A. Ely Beach, Stratford, Conn.:

I claim the employment of an endless chain or belt of troughs, pouches, conveyors or receptacles, moving through tubes or channels, constructed and operating substantially as described for the transportation and delivery of letters, packages and all kinds of freight.

#### 49,700.—Instrument for Throwing Dice.—Benjamin F. Bee, Harwich, Mass.:

I claim the perforated disk, A, and wires, a d, the same being combined and operated substantially as set forth.

#### 49,701.—Table and Bedstead Combined.—J. R. Bennett and P. W. Birk, Brooklyn, N. Y.:

I claim the slatted frames, B H, table top composed of the two parts, D D, connected by end pieces, E E, which are provided with deviating projections, b, to work in dovetail grooves, a, in the upper edges of the bars, B, of the table frame, substantially as herein shown and described.

[This invention consists in a new and useful combination of a bedstead and table, whereby the device may, with the greatest facility, be adjusted so as to serve either as a table or a bedstead, and answer as well in either capacity as if made separately for each.]

#### 49,702.—Metallic Collar.—Louis Billon, Brooklyn, N. Y.:

I claim a collar adapted for attachment to the shirt buttons by means of the auxiliary bifurcated piece, A, substantially as shown and described.

#### 49,703.—Metallic Shirt Bosom.—Louis Billon, Brooklyn, N. Y.:

I claim, as an article of manufacture, a flexible enameled shirt bosom, made up of detachable sections, easily separated and held together, in the manner described, having longitudinal corrugations, the whole constructed and operating substantially as described and for the purpose set forth.

#### 49,704.—Oil Drill.—L. H. Bowman, Norristown, Pa.:

I claim, First, Forming a supplementary chamber, J, within the walls of a tubular drill rod, for receiving the detritus of the rock and other heavy matter from the chamber next above the valve, substantially as described.

Second, I also claim the combination of the central tube, C, communicating at top with the annular surrounding chamber, J, with the water-discharging tube, C', substantially as described.

Third, I also claim the combination of the annular detritus chamber, J, with the water-discharging chamber, C', substantially as described.

#### 49,705.—Gas-light Multiplier.—J. F. Boynton, Syracuse, N. Y.:

First, In an apparatus for carbureting gas for illuminating purposes, I claim the use of partitions of wood, placed so that the grain shall stand vertically when those partitions are constructed with a wedge-like shape, having their lower ends thicker than their upper, substantially as described.

Second, In an apparatus of the kind above contemplated, I claim the use of cotton wicking, or other equivalent material, so arranged and contained that the number of capillary pores shall be all the while rapidly increasing as the fluid hydro-carbon becomes less volatile, substantially as and for the purpose described.

Third, I claim a combination of partitions, bars and wicks, forming a movable cage setting into a box, producing a compound capillary action of porous and fibrous material, substantially as described.

#### 49,706.—Torpedoes for Oil Wells.—J. F. Boynton, Syracuse, N. Y.:

First, In torpedoes for oil wells, and other like uses, I claim the construction of the body of the cylinder of cast metal, inclosed in a jacket of sheet metal, and for the purpose substantially as described.

Second, In a torpedo, constructed as above proposed, I claim retaining the heads in place by means of a jacket inclosing the cylinder, and soldered to the head of the cylinder, as described.

Third, I claim the closing of a torpedo magazine with a diaphragmed chambered plug, substantially as described.

Fourth, I claim for the exploding of a torpedo the combined use of a sheathing box and needle with the diaphragmed chamber plug, substantially as described.

Fifth, In a torpedo exploder I claim the use of a hammer, k, so constructed and operated that the blow, if insufficient, may be repeated without moving the torpedo itself, by means of contrivances substantially as set forth.

Sixth, In a torpedo exploder I claim the use of an aperture to preserve the uniformity of pressure on both sides of the diagram, substantially as described.

Seventh, In a torpedo exploder I claim the use of a suitable substance spread upon the powder in the magazine beneath the liquid chamber, and in such a position that the puncturing of the liquid chamber shall cause the explosion, substantially as described.

#### 49,707.—Stove.—Moses Bratt, Maysville, Ky.:

I claim, First, The arrangement in an open or fire-place stove of an air chamber, K, communicating with the outer air and with the air of a room, between the fire chamber or the reverberating extension thereof and the upper flue space, when the said chamber is also surrounded laterally by flue or hot-air spaces, substantially as above described.

Second, I also claim the air chamber, F, located behind the fire back, b, and connected with the side air spaces, g, and communicating with the fire chamber by means of the opening, E, and extending upward behind the box, M, to the flue, P, substantially as and for the purpose above described.

[This invention consists in a novel arrangement of air and smoke chambers in an open parlor stove, whereby air-heating surfaces are made within the walls of the stove, and the smoke and gaseous products of combustion are consumed by supplying currents of air above and below the fire.]

#### 49,708.—Compositions for Enamels, Paints, Etc.—Morgan W. Brown, Morrisania, N. Y. Antedated Aug. 22, 1865:

I claim, First, A composition of matter, formed and prepared from ground or pulverized marble or natural limestone, and an alkaline silicate as a base, substantially as set forth, for purposes of an enamel cement and plaster.

Second, I claim the use of a carbonate of lime, white oxide of zinc, and silicate of alumina into the base of the composition of matter, for the purposes of a paint, enamel and cement, substantially as set forth.

Third, I claim the mode or process for the preparation of alkaline silicates preparatory to its use in my composition of matter, and for its uses as a varnish in the application of a paint, enamel and plaster, substantially as described.

Fourth, I claim the use and application of the different colors and shades of color by the mode or process of blending by concussion or otherwise into my composition of matter while the same is soft or fluid, and before the same becomes hard, substantially as set forth.

Fifth, I claim the mode and the application of certain temperatures of heat to the articles fabricated from my composition of matter, and to metallic or earthy substances, coated and enameled therewith, substantially as set forth.

Sixth, I claim the use of an oil or an oil and resinous varnish over the composition of matter, after the same have become dry, in one or more coating, substantially as set forth.

Seventh, I claim the use and application of sand and pebbles into my composition of matter, for the purposes of a cement, etc., substantially as set forth.

#### 49,709.—Cigar Machine.—Geo. Buckle, Monroe, Mich.:

I claim the method, substantially as herein described, of producing the fillers for cigars, by first forming a sheet or felt of tobacco and then cutting up that sheet in a clasp in pieces suitable for fillers, and having wrapped these fillers in narrow strips cut from tobacco leaves, pressing them in a suitable press, as set forth.

#### 49,710.—Spirit Level.—R. F. Burnett, New York City:

I claim the case, C, composed of two trough-shaped boxes arranged diametrically in annular flanges, which are secured in the socket, B, substantially in the manner and for the purpose set forth.

Also, The adjustable spring catches, e, in combination with flanges, c, case, C, and socket, B, constructed and operating substantially as and for the purpose described.

[The object of this invention is to facilitate the operation of introducing the vial into the case of a spirit level, and to arrange said case so that the vial can be readily adjusted to any desired angle.]

#### 49,711.—Milk Can Bottom.—Asahel Burnham, Arkwright, N. Y.:

I claim making the bottom, B, of the can, crowning or conical in form, with radiating strengthening ribs, s s, on the under side thereof, in the manner and for the purpose set forth.

#### 49,712.—Lock.—W. C. Bussey, Jackson, Cal.:

I claim, First, The employment or use of a series of rings, E E' E'', and a cylinder, E'', provided respectively with teeth and pawls, and also with annular tumblers, g, to operate in connection with notched arms, C, through which the bolts, B, are moved, substantially as and for the purpose set forth.

Second, The peculiar construction of the arms, C, applied to the

bolts, B, and arranged with the tumblers, g, to operate in the manner substantially as and for the purpose set forth.

[This invention relates to a new and improved lock, of that class in which a series of rotating annular tumblers are employed, and it consists in a novel arrangement of such tumblers, in connection with arms, one or more, and connected with one or more bolts, whereby an extremely simple and efficient burglar-proof lock is obtained.]

#### 49,713.—Guard Finger for Harvesters.—Clark T. Bush, Rensselaerville, N. Y.:

I claim facing, or lining both faces of the slot of the guard fingers of a harvesting machine through which the cutter vibrates, substantially as and for the purpose set forth.

#### 49,714.—Machine for Grinding Apples.—Robert Butterworth, Trenton, N. J.:

I claim, First, A cast-metal cylinder, provided with longitudinal boxes, a, to receive the knives or cutters, D, which boxes project beyond the ends or heads of the cylinders, to receive set screws, E, for setting the knives or cutters, and securing them in position, substantially as set forth.

Second, The sectional concave, composed of plates, H, provided with joints, and having springs, I, bearing against their lower ends, and regulated by rods, L, and nuts, h, substantially as described.

Third, The regulating of the pressure of the spring, I, against the plates, H, by means of the heads or blocks, J, on the fixed shaft, K, and the set screw, f, substantially as set forth.

[This invention relates to a new and improved machine for grinding apples for the manufacture of cider, and it consists in a novel and improved construction of a grinding or cutting cylinder, and also in the employment or use of a series of pressure plates, arranged with springs in such a manner that the work may be done in an expeditious and perfect manner.]

#### 49,715.—Cultivator.—George Calkins, El Paso, Ill.:

I claim, First, The combination and arrangement of the plow beams, D, levers, F, supports, K, levers, E, provided with the rods, L, the cross piece, H, and frame, O, when constructed and operating substantially as and for the purposes set forth.

Second, I claim the combination and arrangement of the plow beam levers, E and F, provided with their fulcrums, as described; cross piece, H, frame, O, and the levers, M and N, when constructed substantially as and for the purposes described.

#### 49,716.—Pump.—James Camaek, Dane, Wis.:

I claim the combination of the water chamber, D, with the cylinders, A, chambers, B, air chamber, C, and the valves, e and f, all arranged and operating as herein set forth.

#### 49,717.—Expanding Drills for Well Boring.—G. F. Case, Brooklyn, N. Y.:

I claim, First, Enlarging the diameter of the bottom or other part of an artesian well, substantially as shown.

Second, I also claim advancing the tool, D, in a horizontal direction, substantially as and for the purpose above described.

Third, I also claim, in combination, the tube, H, the shaft, B, the tool, D, toothed as described, and the hob, I, substantially as shown.

#### 49,718.—Breach-loading Fire-arm.—Cyprien Chabot, Philadelphia, Pa. Antedated June 15, 1865:

I claim, First, The combination of the withdrawer, G, and ejector, e, for backing and throwing out the empty cartridge case when the ejector is detached from, but operated by, the withdrawer as it flies back, substantially as herein described.

I also claim so arranging the ejector, e, with regard to the paths of the withdrawer and the cartridge case, as that its ends, 2, 3, shall be alternately thrown down and up by them as they pass over them, as and for the purpose herein described.

I also claim so arranging the breach-block bolt and the striker or exploding pin as that the latter shall be locked out by the bolt should the bolt fail to shoot into its catch or keeper, as and for the purpose described.

I also claim forcing the bolt into its keeper, if, from any casualty, it failed to shoot home by the blow of the hammer upon the exploding pin or striker before it reaches the cartridge, or simultaneously therewith, substantially as and for the purpose set forth.

#### 49,719.—Soda Fountain.—F. J. Chapman, Huron, Ind.:

I claim the pump cylinder, C, provided with perforated sides, and applied in combination with a vessel, A, containing soda water or other liquid, and with a suitable piston and discharge pipe, substantially as and for the purpose described.

[This invention consists in a pump cylinder, with perforated sides, and combined with a suitable vessel containing soda water or other gaseous liquid and with a discharge pipe, in such a manner that when the piston which works in the pump cylinder is raised above the perforations in the sides of said cylinder, the soda water or other liquid descends, and, on depressing said piston, the liquid contained in the lower part of the cylinder is forced out through the discharge pipe, and a pump is thus obtained which operates without any valve or other part that would be liable to get out of order.]

#### 49,720.—Seeding Machine.—Morell Clark, Castalia, Iowa:

I claim the frames, F, attached to or fitted upon the shaft, E, and provided with the shafts, J, having teeth arms, K, attached, and the bars, M, in connection with the catches, N, all arranged to operate substantially as and for the purpose set forth.

I also claim the adjustable perforated plates, P P, in connection with the perforated bottom, a, or the seed box and the biconical tubes, O, provided with the internal cones, c, substantially as and for the purpose specified.

I further claim the rods, R, passing through the tubes, O, provided with the heads or caps, S, and vibrated as shown to insure the free discharge of the seed.

[This invention relates to a new and improved machine for sowing seed in drills or broadcast, and it consists in a novel arrangement and application of teeth for covering the seed, whereby the teeth are prevented from becoming choked or clogged with weeds, trash, etc.; and the invention further consists in a novel seed-distributing device, whereby the seed is prevented from choking or clogging in the seed box, and, consequently, evenly distributed, and the amount of seed to be sown on a given area regulated as desired.]

#### 49,721.—Saw Mill.—Gilbert H. Clemens, U. S. Army:

I claim the provision upon each head block of the two sets of setting apparatus, C E e' M' C' F' e' e' M', operated alternately and with unequal speed from a high band wheel, substantially as set forth.

#### 49,722.—Railway Chair.—John Cochrane, Wall Tunship, N. J.:

I claim the combination of a spring, or springs, with the rails and chair, or coupling, so as to prevent looseness of the joints, substantially as described.

#### 49,723.—Boot.—Earle D. Coffee, Holliston, Mass.:

I claim the improved mode of making the outer sole of a tap, boot or shoe, viz., of the separate pieces, a, b, c, the welts, d, e, and the fillings, f, g, arranged and applied together and with respect to the insole, h, substantially as described.

#### 49,724.—Ice Pitcher.—Charles Conradt, Philadelphia, Pa.:

I claim combining with an ice pitcher, A, a stand or support, B, so that the same will operate together, substantially in the manner described and set forth, for the purposes specified.

#### 49,725.—Packing Ring for Piston Rods.—W. C. Cornwell, Scranton, Pa.:

I claim the box, A, containing a wide-split ring, a, and two narrow-split or sectional rings, b, b', in combination with the follower, B, and with holes, d, admitting steam to the outer surface of the ring, a, substantially as and for the purposes set forth.

[This invention relates to metallic steam packing for piston rods, valve rods, etc., of steam engines, to be applied by placing the same in the ordinary stuffing board.]



## 49,726.—Axle Box.—Charles Cook, Winsted, Conn.:

I claim, as an improved article of manufacture, a box for the axle of vehicles, constructed of wrought iron, with a true or finished interior surface, and hardened by the usual case-hardening or steel-converting process, substantially as set forth.

## 49,727.—Match Card.—Moses G. Crane, Boston, Mass.:

I claim, as a new article of manufacture, match cards, having a construction substantially as described.

## 49,728.—Steam Generator.—Clay Crawford, East Cleveland, Ohio:

I claim so arranging the tubular grate bars, b, in relation to the flues, a, and fire-place, and draft, that the products of combustion in said fire-place will pass down from the top, around the grate pipes, in accordance with the direction of the draft, substantially as and for the purpose set forth.

I also claim the grate pipes and flues, when arranged in relation to each other and the boiler, substantially as and for the purpose set forth.

## 49,729.—Table.—Richard R. Crowe, Chicago, Ill.:

I claim the combination and arrangement of the table top, A, with the leaves, B C D E, and auxiliary leaves, F G H I, operating as and for the purposes shown and set forth.

## 49,730.—Seedling Machine.—H. D. Dann, Waupun, Wis.:

I claim, first, in combination with the parts, M and N, forming the seed cells of a seedling machine, the rod, R, arms, T, and lever, S, arranged and operating substantially as described.

Second, the seed tubes, J, suspended from the frame of the machine, so that they may at all times hang in a vertical position, substantially as described and for the purpose set forth.

## 49,731.—Seat for Water Closet.—J. N. Davis, Georgetown, Ohio:

I claim a water-closet seat hung upon a fulcrum, and having a suitable guard frame attached to it, all substantially as described and for the purpose specified.

## 49,732.—Joints of Skirt Hoops.—Theodore D. Day, New York City:

I claim a clasp for the hoops of skirts, formed substantially as specified, so that it will fold inward or turn, but will not fold outward, as set forth.

## 49,733.—Plow.—O. P. Dills, Falmouth, Ky.:

I claim the adjustable bar, F, with the wheel, I, rack, J, wheel, D, and standard, G, in combination with the rigid arm, B, all constructed and arranged substantially as shown and specified.

[This invention consists in providing a plow with two wheels, arranged in such a manner that the plow will be self-supporting—that is to say, require no guidance, as is the case with the ordinary single plow—and admit of the driver riding on the plow, without subjecting it to any increased downward pressure to effect its action in the soil, and, at the same time, be capable, by a simple manipulation, of being adjusted to penetrate the earth at a greater or less depth, according to the depth of furrow required.]

## 49,734.—Releasing the Tail Board of Wagon.—Casper Dreher, Detroit, Mich.:

First, The rock shaft, E, provided with the tappets, b, and lever, a, or their equivalents, substantially as and for the purpose specified.

Second, The combination of the rock shaft, E, tappets, b, lever, a, and spring catch, D, substantially in the manner shown and described.

Third, The tappets, b, when connected to a suitable rock shaft, and arranged to operate substantially as herein shown and described.

[The object of this invention is to provide a simple device for instantly and effectually releasing the board of wagons; and it consists in the employment of a rock shaft, extending across the tail board of the wagon, and provided with tappets on its ends, which bear against the noses of the spring catches that are usually used for holding up the tail boards of wagons, in such a manner as to throw them up whenever the rock shaft is turned by a hand lever attached to it for that purpose.]

## 49,735.—Animal Trap.—Alfred Edwards, Chicago, Ill.:

First, I claim the combination of the lever, E, sliding door, y, up-rights, J, and movable platform, K, arranged and operating substantially as and for the purposes herein set forth and shown.

Second, I claim the combination of the cups, F F, and tube, H, containing fluid as described, with the lever, E, and slide y, arranged and operating as and for the purpose set forth.

## 49,736.—Machine for Making Paper Bags.—B. F. Ellis, Dayton, Ohio:

I claim the employment of the block, A, and the folders, c d e f, constructed, arranged and used as and for the purposes specified.

## 49,737.—Device for Removing Cars from the Track.—D. R. Erdmann, Philadelphia, Pa.:

I claim the portable bar, A, with its inclined flange, a, and curved shoulder, b, and having projections, c e, or their equivalents, the whole being constructed and adapted to a rail, substantially as and for the purpose herein set forth.

## 49,738.—Measuring Funnel.—J. M. Estabrook, Worcester, Mass.:

I claim a measuring funnel provided with a central stem and valve, which rises and falls by the action of a spiral groove, said stem being furnished with a series of marks, substantially in the manner and for the purpose set forth.

[This invention consists in a measuring funnel provided with a central stem, which is guided in a socket with a spiral groove, and provided with a pin projecting through said groove, and with a valve at its bottom end, and with a series of shoulders or marks at certain intervals, in such a manner that by the action of the pin and spiral groove the stem, on being turned, rises and falls, and the valve opens and closes, and when the valve is closed, and the funnel filled partially or fully with liquid, the exact quantity of liquid contained in the same can be observed by the marks on the stem, and after the liquid has thus been measured, it can be readily discharged by turning the stem and raising the valve.]

## 49,739.—Process of Distilling Petroleum.—Levi S. Fales, Boston, Mass.:

First, I claim the distillation of crude petroleum or other oils by heat applied above the surface, through the medium of a current or currents of air circulating through the upper part of the still, substantially as herein specified.

Second, The combination, substantially as described, of a still, an air pump or blower, an air-heating furnace, a rose, or other air-distributing device, and a pipe for conveying air from the said pump through the said furnace to the said distributing device, the whole operating as and for the purpose herein specified.

## 49,740.—Method of Settling Stills.—Levi S. Fales, Boston, Mass.:

I claim the combination, under one retort, of two furnaces, D D, two parallel partition walls, C C, which partly support the bottom of the retort, and a central or intermediate return flue, I, common to both furnaces, and forming their communication with the chimney, the whole constructed and arranged within the inclosing walls of the still, substantially as and for the purpose herein set forth.

## 49,741.—Skate.—David J. Farmer, Newark, N. J.:

First, I claim the use of a scroll, D or D', in combination with a radially-sliding hook fitted into the heel-plate or toe-plate of a skate, or in both, substantially as and for the purpose described.

Second, The application of a spring catch, g, in combination with the heel-plate or toe-plate, or both, or with both, and with the re-voicing scroll plate, D D', substantially as and for the purpose set forth.

[This invention relates particularly to a new and improved method of attaching the skate to a boot or shoe, and it consists in the use of a stationary disk forming the guide for two or more radially-sliding hooks, the inner ends or shanks of which catch in a scroll rising from or sunk in the surface of a revolving plate.]

## 49,742.—Railroad Rail.—Benjamin F. Farrar, Springfield, Mass.:

I claim the combination of the rails, a a, piece, A, spring or springs, B, and chair, D, substantially in the manner and for the purpose described.

## 49,743.—Horse Collar.—C. J. Fisher, Waukon, Iowa, Antedated Aug. 27, 1865:

First, I claim the wooden front parts, A A, of the collar, connected at their upper ends by a yoke or pad, B, of leather or other flexible material, substantially as set forth.

Second, The attaching of the yoke or pad, B, to the wooden pieces, A A, by the bolts, b, in connection with the bars, C C, substantially as and for the purpose specified.

## 49,744.—Paper Holder.—J. W. Foard, San Francisco, Cal.:

First, I claim a holder for newspapers and documents, constructed and operated substantially as above described, the fastening pin or pins being clamped by the action of a screw.

Second, I also claim in newspaper holders or files the combination of a hinge at one end, with the fastening pin at the other end, constructed and arranged substantially as above described.

## 49,745.—Sewing Machine.—Jacob L. Frey, New York City:

First, I claim a looping instrument, formed in the manner specified, and to which the movements described are communicated, to draw a loop of thread from below the cloth, and present it to the needle above the cloth, as set forth.

Second, I claim the finger, S, around which the loops are laid in performing the sewing, and from which they are discharged as the material moves, as and for the purposes set forth.

Third, I claim the levers, g and o, the rod, f, and the diagonal cam, p, in combination with the looper, i, for imparting to the same the required movements, as specified.

## 49,746.—Traction Engine for Common Roads.—Jesse Frye, Brooklyn, N. Y.:

I claim, first, driving each wheel of the engine by a separate and independent cylinder or cylinders, and their actuating appliances, substantially as and for the purpose described.

I also claim the separate engine or steam cylinders, H, for operating the mechanism that turns the front wheels of the engine to guide or direct its movements, substantially as described.

I also claim connecting the front and rear frames, trucks or portions of the engine by means of the stem or bar, G, substantially as and for the purpose described.

I also claim attaching the front wheels to the front frame by means of the axles, substantially as shown and described, so that said wheels may be freely turned, and yet remain in gear with their respective driving cylinders, substantially as described.

I also claim, in combination with an engine for working on common roads or on the natural surface of the ground, a self-acting grade governor for regulating the supply of steam on ascending or descending grades, substantially as described.

I also claim dividing the smoke stack vertically into two sections, and hinging the sections so that it may be brought close down in passing over or under bridges, etc., substantially as described.

I also claim, in combination with a steering mechanism worked by steam, as described, the stationary sights, t u, and the moving one, x, for running the engine on defined lines, as described.

## 49,747.—Paper Shirt Bosoms.—Joseph B. Gardiner, Springfield, Mass.:

I claim as a new article of manufacture a paper shirt front, made in imitation of a cloth front, by imitating the plaits of the same by arranging and depressing parts of the same, substantially as described.

## 49,748.—Washing Apparatus.—Charles C. H. Glidden, Boston, Mass.:

I claim my improved manufacture or washing apparatus as having its waste water tank a support for the fresh water vase and bowl, and provided not only with devices or ledges, a b l, for holding the vessels in place on it, but with an opening or short tube, D, arranged as described to receive a pipe, c, from the wash bowl, the whole being as specified.

## 49,749.—Process for Making Sirup and Sugar from Indian Corn and other Grain.—Frederick W. Goessling, Jersey City, N. J.:

First, I claim the use of animal or lichen carbon and equivalents in the process of making sirup and sugar from Indian corn or maize and other grains before and after neutralization, substantially as set forth.

Second, The use of prepared carbonate of quick-lime in the manufacture of sirup and sugar from Indian corn or maize and other cereals, substantially as set forth.

Third, Pressing the sugar after it has been once crystallized, and re-melting it, and again putting it into molds for crystallization, substantially as described.

Fourth, The process or method of making sirup and sugar from Indian corn or maize and other cereals containing amylaceous matter, so far as the time is developed in each or either step or degree thereof, substantially as herein described.

Fifth, The manufacture of sirup and sugar from Indian corn or maize and other cereal grains containing amylaceous matter by the process or method substantially as herein described.

Sixth, A cane-like sirup and a cane-like sugar produced from Indian corn or maize or other grains containing amylaceous matter, as a new product of manufacture, substantially as set forth.

## 49,750.—Method of Making Sugar from Indian Corn or other Grain.—Frederick W. Goessling, Jersey City, N. J.:

First, I claim the method or process of manufacturing sugar from Indian corn or maize and other cereal grains containing amylaceous matter, in each or either step or degree thereof, substantially as described.

Second, A cane-like sugar produced from Indian corn or maize, as a new product of manufacture, by the method or process substantially as described.

## 49,751.—Method of Making Sirup from Indian Corn or other Grain.—Frederick W. Goessling, Jersey City, N. J.:

First, I claim the method or process of making sirup from Indian corn or maize and other grains containing amylaceous matter herein described, in each or either step or degree thereof, substantially as set forth.

Second, A cane-like sirup produced from Indian corn or maize or other cereals containing amylaceous matter as a new article of manufacture, substantially as set forth.

## 49,752.—Lamp.—Eli H. Green, Baltimore, Md.:

I claim the mode of constructing the lamp body, A, base, B, and projecting rod or tube, D, substantially as and for the purposes herein specified.

I also claim the shield, H, in combination with the lamp, as described, for the purpose herein set forth.

I also claim the construction of the burner or burners, substantially as herein specified.

I also claim the perforations, r r, notches, s s, either together or separately, in the burner lips, as a distinct improvement, substantially as and for the purpose herein set forth.

## 49,753.—Gate.—S. Grenell, G. Bez and H. C. Stoll, Mokena, Ill.:

We claim the lever, D, and slide, C, provided with or having the levers, F F, attached and connected with the gate, E, substantially as shown and described, to operate in the manner as and for the purpose set forth.

[This invention relates to a new and improved gate of that class which are capable of being opened and closed by a driver or rider without getting out of a vehicle or dismounting from a horse. The invention consists in hanging the gate upon a lever, which is attached to the fence and connected to a rising and falling slide, having levers connected to it, and all arranged in such a manner that the gate may be opened and closed by a rider and driver from a vehicle or on horseback with the greatest facility.]

## 49,754.—Mode of Coupling and Uncoupling Cars.—S. H. Hamilton, Bushnell, Ill.:

I claim the lever, F, suspended from the crane, D, and applied to the car in the manner substantially as and for the purpose set forth.

## 49,755.—Brush for Cleaning Metallic Plates.—E. A. Harvey, Wilmington, Del.:

First, I claim fixing elastic strips or other material, A, in the head, B, so as to provide a reserve of material, which is made available when the strips are adjusted, as explained.

Second, In a brush constructed, as above specified, with sockets passing completely through the head, I further claim scrubbing strips or tufts composed of or surrounded by india-rubber, to adapt them to be adjusted as required, and retain their positions in the head while in use, as explained.

Third, I claim securing the fibrous material, A, in the head, B, by means of the elastic bushing, C, substantially as described.

## 49,756.—Grain Binders.—John F. Hemperly and Charles Barna, West Liberty, Iowa:

First, We claim the toothed sector, E, in connection with the plow, F, slotted plate, G, the arm, W, carrying the wire, A, and the knife or cutter, B, all arranged to operate in the manner substantially as and for the purpose set forth.

Second, The arrangement of the spool, P, and pulley, R, with the ratchets, e e, in connection with the band, R, and lever, S, substantially as and for the purpose specified.

Third, The slotted slide, I, connected with the lever, K, and arranged to operate in connection with the arm, W, for the purpose set forth.

Fourth, The arrangement of the arm, W, on shaft, X, in combination with the levers, K and S, substantially as shown, so that they will move simultaneously by the application of power to lever, K, as and for the purpose described.

Fifth, The spring catch, V, and the spring, T, arranged with the toothed sector, E, in order to hold the same until the twist is to be given the band, and then to move sector and give the hoist, substantially as described.

[This invention relates to a new and improved device for binding grain, the same being designed to be applied to a harvester.]

## 49,757.—Bell-pull.—Henry Horner, New York City:

I claim the combination with a bell-pull of a rubber or other suitable elastic cushion or spring, arranged substantially in the manner described and for the purpose specified.

[This invention relates to a novel arrangement of bell-pulls, especially adapted for steamboat use, the principal objects of which are to obviate the noise now occasioned by the ordinary bell-pulls, and also to relieve its casing from being worn or battered.]

## 49,758.—Boring Brace.—J. A. and H. A. House, Bridgeport, Conn.:

We claim, first, locking the stock of the brace with the drill stock, substantially in the manner described, for the purpose set forth.

Second, The combination of the handle, the flat link chain, and the drill stock, substantially in the manner and for the purposes set forth.

Third, The sliding stops or its equivalent, substantially as and for the purposes set forth.

## 49,759.—Piston Packing for Deep Wells.—C. H. Jackson, Angola, N. Y.:

I claim the combination of an expansible packing shell, C, made of leather or other suitable material, with a piston head, A, so constructed as to form an annular space between it and the packing shell, which annular space communicates by means of small channels with the rising column of fluid, so that the pressure of such column of fluid will expand the packing shell outwardly against the pump barrel, substantially as described.

## 49,760.—Match-safe.—R. W. Jenks, Providence, R. I.:

I claim the opening of the bottom, I, in connection with the springs, F, substantially as and for the purposes set forth.

## 49,761.—Plow.—C. F. Johnson, Jr., Owego, N. Y.:

First, I claim the plow, running at right angles, or nearly so, to the forward motion of the machine, in connection with the groove or guides, substantially as described.

Second, I claim the plow, rotating on an axis, so as to be easily withdrawn from the ground when the stroke is finished, and again presented in a position to enter the ground.

Third, I claim the guides or grooves and the cross-head, for the purpose of steadying the plow, as described.

Fourth, I claim the arrangement of the guides and the cross-head, by which the back of the cross-head, after emerging from the guides or grooves can rise and allow the plow to turn up endwise and be withdrawn from the ground, in the manner described.

## 49,762.—Meat Cutter.—R. V. Jones, Canton, Ohio:

First, The combination of two cylinders, both of which are provided with spiral flanges a portion of their length, and the one the balance of its length, with a right screw or thread; the other with a left screw or thread, working together as and for the purpose herein specified.

Second, The combination of two cylinders, B and C, constructed as described, with a ribbed case, as and for the purpose herein specified.

## 49,763.—Railroad Joint.—K. W. King and T. C. Har- graves, Boston, Mass.:

We claim the double-headed bolts, operating in connection with the slotted fish plates to confine the rails in position, substantially as set forth.

## 49,764.—Scissors Sharpener.—T. K. Knapp, Worcester, Mass.:

I claim combination with the frame, A, of the discharge opening, e f, and circular cutter, C, having an enlarged hole, d, through its center, whereby all clogging of the instrument is prevented, while the periphery of the cutter, C, can be ground or turned off without impairing its operation, all as set forth.

## 49,765.—Tube Expander.—J. H. Kuickerbocker, Philadelphia, Pa.:

First, I claim the series of radially moving arms, A A, arranged and supported in an annular base, B, so as to operate or be operated together, substantially as described, for the purposes specified.

Second, I claim the employment of removable or changeable dies, I, in combination with the radially moving arms, A A, substantially as and for the purposes described.

Third, I also claim, in combination with an expander, provided with radially moving arms, A A, as described, the employment of the hollow conical frustrum, C, operated together by any suitable power, as and for the purposes described.

## 49,766.—Bureau and Commode.—Geo. W. Kock, New York City:

I claim a combined bureau and commode, either with or without a bed, made substantially as herein described, for the purposes specified.

## 49,767.—Hat Ventilator.—A. Komp, New York City:

I claim a ventilator, composed of a supporting plate, A, and spring, B, secured together so as to leave a crescent-shaped space, C, substantially in the manner and for the purposes set forth.

## 49,768.—Steeping, Growing and Drying Malt.—A. Kreusler, New Lebanon, N. Y.:

I claim the within-described method of effecting the steeping, the growing and the drying of malt, in an apparatus composed mainly of a wire-gauze cylinder, revolving in a case with a jacket, substantially in the manner set forth.

## 49,769.—Lamp.—William Lassell, Boston, Mass.:

I claim surrounding the lower part of the wick tube and wick with an enlarged tube, made in two parts, one sliding within the other, to adapt it to lamps of different depths.

## 49,770.—Mode of Starting Railway Cars.—Wm. Lawton, New York City:

First, I claim the combination of the lever, E or E2, pawl, D, ratchet wheel, G, with the axle and draw hook of a railway car, the whole operating and constructed substantially as herein described.

Second, In combination with the double-ended pawl, D, I claim the fixed guide or projection, H, operating in the manner and for the purpose herein described.

Third, I claim the lever, J, and stop, n, in combination with pawl, D, and ratchet wheel, C, substantially as and for the purpose herein specified.

## 49,771.—Wagon Brake.—Nelson Lezat, New Baltimore, N. Y.:

I claim the cross bar, h, carrying the fulcrum, l, of the secondary lever, k, in combination with the horizontal levers, d d, and brake blocks or shoes, g g, as and for the purposes specified.



49,772.—Axle Box.—Edwin Lockwood, Bordentown, N. J.:

I claim the construction and use of the packing C, composed of two parts, F F, one part, E, being fixed and the other part being adjustable, and regulated by a screw, F, or its equivalent, in combination with the chamber, B, at the rear of the box, and the plate, D, which, with the packing, is fitted in said chamber and secured in position by bolts, H, substantially as and for the purpose set forth.

[This invention relates to a new and efficient means for preventing the admission of dust, dirt, etc., into the rear end of the axle box around the axle, thereby preventing the cutting and wearing of the axle by means of grit and hard foreign substances, which would otherwise work in between the axle and the bearing in the box.]

49,773.—Projectile for Ordnance.—Orazio Lugo, New York City:

I claim the employment of a charge, D, in front of the projectile, substantially as and for the purpose herein specified.

49,774.—Basket.—E. B. Lyman, Bridgeport, Conn. (late of Waterbury, Conn.):

I claim forming a base of solid rails, D, in the construction of baskets, hampers and similar articles, and securing their sides and bottoms to the rails by means of grooves, e e', substantially as above described.

49,775.—Water-proof Fabric for Hats, Etc.—William C. Mahow, Covington, Ky.:

I claim, as a new, and cheap, and improved article of manufacture, the water-proof composition hat or cap, made substantially as described.

49,776.—Oil Can.—John Mayher, East Hampton, Mass.:

First, I claim the combination of the socketed cross bar, b, and spring, a, when located within the can, and adapted to act upon the bottom in the manner specified.

Second, in combination with the above, I further claim the disk, C, applied as and for the purpose described.

[This invention consists in a flat disk, forced by the action of a spring against the inner surface of the bottom of an oiler in such a manner that by the disk the force exerted by the spring is divided over a large surface, and injury to any part of the boiler is avoided, and at the same time sufficient electricity is imparted to said bottom to make the oil flow from the spout by a gentle pressure on it with the thumb.]

49,777.—Instrument for Testing Petroleum.—Adolph Millocher, Jersey City, N. J.:

I claim the oil receptacle, containing a wick tube or burner, to heat and inflame the petroleum or other oil, in combination with the thermometer introduced into such receptacle, for the purposes and as specified.

49,778.—Packing for Oil-well Tubes.—George E. Mills, New York City:

First, I claim a packing, consisting of a tube or bag of leather, having a bottom and top secured firmly to the discharge pipe, the top forming a cup in the upper end of the leather tube, which will expand and make a valve cut-off against the walls of the well, as herein described, for the purposes set forth.

Second, I claim, in combination therewith, a gas escape pipe, arranged in relation to the cylinder and packing, substantially as described.

49,779.—Clothes Rack.—John O. Montignani, Albany, N. Y.:

I claim First, The rod, A, with its groove, e, in combination with the hooks, H, and the rings, c, fitted to rod and for the purpose described.

Second, The bracket, consisting of a back plate, E, and hook, H, with its rings, C, and tongue, Z, united together by means of the button, X, and the hole, a, in the manner and for the purpose described.

Third, The rod, A, with its groove, e, the bracket formed by the back plate, E, and a hook, H, with its ring, C, the hooks, H, with their rings, C, and tongues, Z, in combination with each other, substantially as described, together forming an improved clothes rack.

49,780.—Door Mat.—F. V. Noyes, Mattoon, Ill.:

I claim the method, substantially as above shown and described, of making door mats of the leaves or shucks of corn, or any other suitable material, manufactured or unmanufactured.

[This invention consists in a novel way of making door mats by the use of a skeleton frame, in which are inserted corn shucks or leaves, hemp, manilla, broom corn, or any other fibrous substance manufactured or unmanufactured, the several strands being secured in the frame by means of keys.]

49,781.—Ash-sifting Shovel.—A. M. Olds, Chicago, Ill. Antedated Aug. 25, 1865:

First, I claim constructing the bottom of a shovel of one or more movable slats, pivoted to the frame, substantially as and for the purpose set forth.

Second, Placing the tenons on which said slats swing in front of their edges, substantially as and for the purpose described.

Third, Curving the edges of the slats, substantially as and for the purpose specified.

Fourth, The arrangement of the spring catch, D, in combination with the movable slats, C, and shovel, A, constructed and operating substantially as and for the purpose set forth.

49,782.—Method of Joining Sheet-metal Bands.—William Painter, Baltimore, Md.:

I claim the lock or fastening for rivets of blacking boxes and similar purposes, formed by making incisions through the lap and raising and expanding the parts between them, substantially in the manner described.

49,783.—Packing for Oil-well Tubes.—John Parkham, Jr., Philadelphia, Pa.:

First, I claim an india-rubber cup-shaped packing, having one or more indentations in it, so that it will bend or yield when the tubing for any reason is drawn from the well, and thus prevent jamming, substantially as described.

I also claim the fastening of such cup-shaped packing to the tubing by clamping its base between lock-nuts screwed into the tubing, as herein described and represented.

49,784.—Combined Pocket-knife and Pistol.—A. J. Peavey, South Mountain, Me.:

I claim the trigger, t, h, spring, i, main-spring, f, and hammer, H, with projections, g and p, all constructed and arranged as and for the purposes described.

[This invention consists in the arrangement of small barrel and suitable mechanism for exploding the charges within the handle of an ordinary pocket-knife, in such a manner that the pistol attachment does not in any way interfere with the ordinary use of the knife, and the whole can be conveniently carried in the pocket.]

49,785.—Device for Stripping Cane.—T. W. Peirce, Minneapolis, Minn.:

I claim the radial sections, B, fitted to the annular plate, A, and encompassed by an elastic band, C, substantially as and for the purpose set forth.

I further claim having the upper ends of the parts, c, of every alternate section, provided with projecting ends, to lap over the ends of the intermediate sections, substantially as and for the purpose specified.

[This invention relates to a new and improved device for stripping the leaves from sugar cane, preparatory to crushing and expressing the juice therefrom. The invention consists in placing a series of radial sections in an annular plate, and encompassing the same with an elastic band, whereby the sections are made to press against the stalks of cane, and at the same time allowed to yield or give to accommodate themselves to the varying thickness of the stalks while the latter are being drawn through the central opening formed by the inner surfaces of the sections.]

49,786.—Spring.—J. C. Plumer, Boston, Mass.:

First, I claim a spring, which is constructed of two or more arms or levers, united by joints, and which derives its elasticity from a piece or pieces of rubber fixed in or between the arms, as described.

Second, The plates applied to the exposed surfaces of the rubber, and connected by a bolt, in combination with the described spring, both as and for the purposes described.

49,787.—Reservoir for Compressed Air.—Louis Ransom, Lansingburg, N. Y.:

I claim the coil, c, immersed under water, in combination with the supply pipe, b, and reservoir, A, constructed and operating as and for the purpose set forth.

This invention relates to a receiver or reservoir, which is designed to receive the air from a condensing engine, and, from its large radiating surface, give off the heat, which, by compression, is liberated from the air, while, to facilitate the operation of cooling, the tube leading from the condensing engine is immersed in water, and the air forced through it into the tubes or vessels constituting the reservoir. The air compressed into this reservoir is designed to propel street cars, other vehicles and machinery.]

49,788.—Register for Libraries.—W. T. Ray, Philadelphia, Pa.:

I claim a library register, constructed, arranged and operated in the manner herein described.

49,789.—Shirt-collar Stud.—Joseph Ridge and S. F. Estill, Richmond, Ind.:

We claim, First, Pivoting the face-plate to the under portion of the fastening, so that it may be swung around to expose the shank or lock the ends of the collar, substantially as described and represented.

We also claim the combined pivoting and hinging of the face-plate to the shank or under plate, so that it may be swung around on its pivot and then raised upon its hinge for readily removing or replacing the stud, and locking it when in place, substantially as described.

Second, We also claim, in combination with a shank that will fill, or nearly so, the button holes of the collar or other garment, the arranging of the long diameter of the back button at right angles to the line of length of said shank, so that the shank shall prevent the stud from turning, and thus allow the back button to come out of its button-hole, substantially as described.

49,790.—Naval Grappling Apparatus.—Silas Riggs, Blanchester, Ohio:

I claim the overhanging hooked bar, D, shield, E, vertical guides, F, and actuating windlasses, G and H, or their equivalents, the whole being arranged and operating substantially as set forth.

49,791.—Sawing Machine.—F. W. Robinson, Richmond, Ind.:

I claim the combination of the bent and slotted saw bar, G, fixed roller, H, crank or wrist wheel, E, and pitman, F, as and for the purpose described.

[This invention relates to a machine of simple construction for sawing wood or logs transversely with the grain, and is more especially designed for sawing cord or fire-wood by horse-power. The object of the invention is to obtain a simple device for the purpose specified; one which may be cheaply constructed and not be liable to get out of repair or become deranged by use. The distinctive feature of the invention consists in the means employed for giving the downward pressure to the saw, whereby the excessive friction attending the plans now employed for that purpose is avoided.]

49,792.—Bullet for Rifled Fire-arms.—Wm. Rosee, New York City. Antedated Aug. 25, 1865:

I claim an elongated soft metal bullet, constructed with a cylindrical portion, a, to fit the lauds of the bore, without entering the grooves, with a band, b, around the rear, of such size as to enter the grooves of the bore in loading, and with a cylindrical test, c, at its front extremity, the whole combined substantially as and for the purpose herein specified.

49,793.—Stopper for Bottles.—Frederick Schlich, New York City:

First, I claim securing the swinging ball by the fulcrum loops, formed and secured in the manner set forth.

Second, I claim the elastic stopper, in combination with the tapering projection, l, and screw, o, as and for the purposes specified.

Third, I claim the swinging ball, in combination with the elastic stopper and wing or wings, 2, as and for the purposes specified.

Fourth, I claim the stopper, formed of india-rubber, with a flange to take the top of the bottle and the cylindrical portion entering the neck, so as to render the stopper tight, as set forth.

49,794.—Clothes Sprinkler.—E. Schnurr, Monroe, Mich.:

I claim a device for sprinkling clothes, consisting of a reservoir, A, provided with a suitable air duct, C, constructed substantially as herein shown and described.

[The object of this invention is to provide a handy little device for effectually sprinkling clothes before ironing the same, and it consists of a reservoir having a perforated face or bottom and a suitable handle attached thereto, and an air tube or duct communicating with the reservoir and opening out on one side of the handle thereof, for admitting air when it is desired to use the sprinkler.]

49,795.—Sole for Boots and Shoes.—S. J. Seely, New York City:

I claim the combination of a thin, metallic sole, corrugated at its shank with the sole and insole of boots or shoes, when turned over upon and sewed or pegged into the insole, and arranged between them, substantially in the manner and for the purpose described.

49,796.—Quartz Crusher.—Daniel Sexton, San Gabriel, Cal.:

I claim the employment or use of the cams, C, in connection with wheels, I, on the stamp rods, H, all constructed and arranged to operate in the manner and for the purpose herein set forth.

[This invention relates to a new and improved machine for crushing quartz, and it consists in the employment or use of a series of cams placed on horizontal shafts, in connection with fixed wheels placed on the rods of the stamps, all being so arranged that the cams will elevate the stamps by acting against the wheels, and the stamps rotated while being elevated and also while falling, so as to insure the stamps wearing evenly.]

49,797.—Ice-cream Freezer.—John S. Shattuck, Medford, Mass.:

I claim the stand elevator, having three cams or projections which raise and lower the tub and cream can into or out of connection with the gears, and at the same time afford a fixed base or support for the tub, as specified.

49,798.—Drill for Artesian Wells.—Jehyleman Shaw, Bridgeport, Conn.:

I claim a drill for boring a path for the soil-pipe through bowlders and other hard objects which obstruct the descent of such pipe, constructed and operated substantially as above shown.

49,799.—Plow.—William S. Spratt, West Manchester, Pa.:

I claim an off-set or bed for the plowshare of cast-steel or wrought-iron plows, said off-set or bed being made separate from, or in connection with the mold-board, and welded to the land side, as herein described and set forth.

49,800.—Horse-rake Teeth.—Ariel B. Sprout, Hughesville, Pa.:

First, I claim grooving or hollowing the sides of the tooth so that its thickness through its center on the line, d, Fig. 3, may be less than on the lines, a, b, same figure, in order to place the greater amount of metal where it is needed to give effectiveness with economy of material.

Second, The combination of the taper with the curve of the tooth, said taper extending from about the portion C to the point d, said curve being about a semi-circle, so that by the combination of the taper and the curve the inward tractive power of the curve is gradually increased from the point d to about the portion C, substantially as herein described, and for the purpose set forth.

49,801.—Hydrant.—Albert Stephenson, St. Louis, Mo.:

I claim a portable or removable hydrant, composed of the chamber, B, and pipe, D, connected by a screw or other coupling, and provided with a valve, F, at the lower end of D, a discharge spout, J, and a waste valve, K, arranged to operate with the opening, j, in D, substantially as set forth.

I further claim the box, A, when used in combination with the hydrant, constructed and arranged as described.

[This invention relates to a new and improved hydrant for drawing and stopping at will water or other fluids from reservoirs, or from pipes fed or supplied from reservoirs. The object of the invention is to obtain a hydrant which may be readily removed or detached when necessary, and also readily applied to the main, and one which will admit of the escape of the waste water, so as to avoid the contingency of the hydrant freezing up in winter.]

49,802.—Pendulum Level.—B. F. St. John, Shelbyville, Ind.:

I claim the index hand, D, extending from the extreme hand of the pendulum, B, and bent around the edge of the dial, C, in combination with the central stud, b, constructed and operating as and for the purpose set forth.

[This invention relates to an improvement in that class of level in which the position of the index hand is governed by the action of a weight which swings on an axle or stem.]

49,803.—Sewing Machine.—J. N. Tarbox, Buffalo, N. Y.:

First, I claim the combination of the following devices:—1st, A looper, formed as an arc of a circle, with an eye near the end, and a groove extending along the side and edge thereof to an eye near the back end; 2d, An arm at the end of a rock shaft, placed diagonally to the bed of the machine and to the feed; 3d, A pinion and segment acted on by a cam, for giving motion to the looper, and carrying the point and eye from below the cloth up over the edge, and, 4th, An eye-pointed needle acting from above the cloth and taking a loop from the looper, and having a loop of thread taken from itself below the cloth, substantially as specified.

Second, I claim the combination of an eye-pointed needle, acting from above the cloth, and a looping instrument acting from below the cloth in the arc of a circle, at an inclination to the eye-pointed needle, as specified, with a pressure foot acting to keep the cloth to the bed, but capable of being swung aside for passing the button hole over the point of the looper, as specified.

Third, I claim the eye-pointed needle, curved looper, and swinging pressure foot, fitted and acting as aforesaid, in combination with the hook, y, for holding the button-hole open when the looper ascends, as specified.

Fourth, I claim the hook, g, m, in combination with the looper, for the purposes and as specified.

Fifth, In combination with an eye-pointed needle acting above the cloth, and a looping instrument passing up from below the cloth, and delivering its loop of thread over the needle, in the manner specified, I claim the cam, p, lever, m, and eye, z, to take up the slack of the needle thread, as specified.

Sixth, The combination with the eye-pointed needle, i, and looper, o, operating substantially as specified, I claim the heart-shaped slot, h, and crank pin, l, or equivalent mechanism, for communicating the movement specified to the needle, so that the same will pause while in the cloth, and move rapidly when out of the cloth, as specified.

49,804.—Printers' Blanket.—John Taylor, Lawrence, Mass.:

I claim an india-rubber printing blanket, having an absorbent and slightly elastic or yielding surface, composed of cork or other suitable substance, for the purpose specified.

49,805.—Hod Elevator.—W. H. Totten, Academia, Pa.:

I claim hoisting a hod by means of a movable elevator, C, constructed and operating substantially as described.

49,806.—Rein Holder.—T. L. Tripp, Prescott, Wis.:

First, I claim a device for holding the harness reins, consisting of the jaws, D D, substantially as herein specified.

Second, The combination of the jaws, D D, body, A, projecting jaws, a, a spring, e, substantially as shown and described.

Third, Making holes or slots, c c, in the body, A, through which to pass the reins, to prevent their becoming tangled and twisted, substantially as described.

49,807.—Table and Apparatus for Invalids.—Stephen Ustick, Philadelphia, Pa.:

First, I claim the combination of the bars, B B, with the bracket, A, for the support of the table, C, when the said bracket is connected with a bedstead, substantially as described.

Second, The combination of the book support, G, writing board, I, and looking-glass, J, with the table, C, by means of the slide, H, and way, F, substantially in the manner above set forth.

49,808.—Dies for Furniture Nails.—Wm. H. Van Gieson, Waterbury, Conn.:

I claim a series or set of dies, A C E D and F G, for forming and attaching the heads of furniture nails to the shanks, substantially as described and to the effect set forth.

49,809.—Steam Engine.—G. J. Washburn, Worcester, Mass.:

First, I claim the combination of the pistons, B B, discs, C C', attached to a stem, D, with a cylinder provided with ports, which open into the spaces between and beyond the discs and pistons, in the manner and for the purpose described.

Second, I claim combining two or more such cylinders by means of connecting passages, through which live steam or other fluid under pressure is supplied from one cylinder to another, making the discs, c c', which are located between the pistons of one cylinder, act as a valve to the other cylinder or cylinders, whether the described apparatus be used as an engine or a valve.

Third, I claim arranging a valve which gives steam to the effective spaces between the pistons, and upon the same stem with them.

Fourth, I claim arranging a valve which connects the effective spaces with the exhaust pipe between the pistons and upon the same stems with them.

Fifth, In combination with the said pistons, B B', discs, C C', and stem, D, I claim arranging the crank of the main shaft within the stem or exhaust space of the cylinder.

Sixth, I claim the arrangement of the valves for determining the extent of the expansive action, by proportioning the width of the disks and ports, as described.

Seventh, I claim imprisoning a body of steam, of not over a determinate pressure, within the cylinder, for the purpose described, by means of closing the exhaust, as described.

Eighth, I claim so arranging the loop on the piston stem, or its equivalent, as to cause the piston to pass the midlength of its cylinder before its crank has reached its midway or vertical position.

49,810.—Steam Generator.—Geo. J. Washburn, Worcester, Mass.:

First, I claim, in apparatus so constructed as to use volatile results of combustion, in combination with the steam under equal pressure, the cleanser, E, which is distinct from the boiler, and within which the said volatile products are cleansed.

Second, In apparatus so constructed as to use the volatile results of combustion, in combination with steam under equal pressures, I claim the cleanser, E, Fig. 1, within which steam is generated by the heat of the said volatile products, which pass through and are cleansed therein.

Third, In apparatus so constructed as to use the volatile products of combustion, in combination with the steam under equal pressures, I claim the generator placed inside of the furnace.

49,811.—Apparatus for Removing Hair and Lime from Hides.—Samuel S. Weed, Stoneham, Mass.:

I claim the corrugated cylinder, B, with the rubber or elastic material, b, operating substantially as and for the purposes specified.

I also claim the feed rolls, J K, in combination with a corrugated cylinder, B, operating substantially as described.

I also claim the pressure roll, E, in combination with a corrugated cylinder, B, and feed rolls, J K, operating substantially as set forth.

I also claim the combination of a corrugated cylinder, B, feed rolls, J K, and the yielding pressure roll, E, operating substantially as set forth, for the purposes described.

49,812.—Horseshoe.—Augustus Weltman, West Union, Iowa:

I claim the lips or spurs, D, on the upper surface of each part, A, of the shoe, in connection with the flanges, C, screws, b, and the flange, G, at the front of the shoe, substantially as described.



I further claim constructing the shoe of two equal parts, A' connected at their front ends by a pivot, a, when used in connection with the plate, F, attached to said parts by screws, H, and either with or without the flanges, c, as set forth.

[This invention relates to a new and useful improvement in that class of horseshoes which are attached to the hoof without the aid of nails. The object of the invention is to obtain a means for securing the shoe to the hoof without the use of nails, and which will prevent the animal becoming hoof-bound, and at the same time firmly secure the shoe to the hoof.]

49,813.—Stirrup Fastening.—C. H. Wellman, New York City:

I claim the combination with a sliding hook or pin of a buckle, made of any desired shape, a hinged or pivoted side, arranged and operating together substantially in the manner described and for the purposes specified.

49,814.—Loom.—Joseph Welsh, Philadelphia, Pa.:

I claim producing the herein-described changes in a loom, by means of any suitable device, to be operated by hand at the will of the attendant, substantially as and for the purpose described.

49,815.—Baling Press.—Joseph P. White, New York City:

I claim the rack rod, E, and hollow screw spindle, F, when employed in connection with the worm wheel, G, worm, I, and pinion, d, to operate the follower, K, in the manner described.

49,816.—Plow.—E. G. Whiting, Northfield, Minn.:

I claim lapping the forward portion of the share, E, around the standard, C, as described and represented at b b', Fig. 4.

[This invention consists in a novel and improved manner of constructing steel plows, whereby the same may be readily kept in repair or proper working order, the several parts being capable of being detached when worn, and new parts inserted in their place.]

49,817.—Grain Register.—Jonas T. Wiley, Claytown, Iowa:

I claim, First, The registering apparatus, substantially as described, consisting of the crank, shafts, wheels and indices, in combination with the projection on the shaft and the snapping spring, which audibly indicates the scoring, and prevents the revolution of the shaft in the wrong direction.

Second, The combination of the plate, Q, with the spring, F, and shaft, D, by which the machine may be seen in the reverse direction when the plate is interposed to prevent the engagement of the projection, E, on the end of the spring, F.

Third, The arrangement of the shafts, J K L, and the strap, M, with the opening in the side of the box, and the unshipping slot, S, substantially as described.

49,818.—Seeding Machine.—Henry Williams, Kenosha, Wis.:

I claim the employment or use in a seeding machine of two shafts, D D, provided with oblique seed-distributing wheels, E, and having the wheel, B, on which the machine is mounted secured to them, substantially as and for the purpose herein set forth.

Second, The peculiar form or construction of the seed-distributing wheels, E, substantially as herein specified.

[This invention relates to a new and improved machine for sowing seed broadcast, and it consists in a certain construction and arrangement of parts, whereby the seed may be sown in greater or less quantity over a given area, as may be required, and the work performed in a superior manner, and with very little labor or manipulation on the part of driver or operator.]

49,819.—Gate Fastening.—John P. Woodcock, Bedford, N. Y.:

I claim the combination of the thumb spring levers, m m, spring levers, h h, with hook-shaped ends, and hollow casing or socket, r, arranged together substantially in the manner described and for the purpose specified.

[For an illustration and description of this invention see No. 1, present volume, of the SCIENTIFIC AMERICAN.]

49,820.—Fence.—Wm. D. Woodruff, Phelps, N. Y.:

I claim the combination of the metallic feet or angle irons, C, with the posts, B, and longitudinal bars, C, the whole constructed and operated substantially as described.

49,821.—Chest and Table.—G. W. Zeigler, St. Louis, Mo.:

I claim the double lids, a b, the same being hinged together at c c, and the lid, a, hinged to the box, A, by means of the straps, f f, so that in one position, a and b only serve as a lid to the chest, so that when in another position a b and the chest form a kitchen table, and in a third position the same form a dough-kneading board, arranged and constructed as hereinbefore set forth.

49,822.—Fastening for Scythes.—Wm. C. Barker, Providence, N. Y., assignor to B. B. Yale, New York City:

I claim the securing of scythes to snaths by means of an eye bolt, C, arranged in such a manner as to clamp firmly the heel or tang of the scythes to the chamfered surface of the snath, and at the same time admit of being adjusted laterally, so as to place the scythes in a more or less angular position with the snath, substantially as shown and described.

[This invention relates to a new and improved fastening for securing scythes to their snaths, whereby the scythe may be readily adjusted more or less angularly with the snath; that is to say, the point of the scythe adjusted nearer to or further from the operator, as may be desired, and the scythe at the same time firmly secured to the snath.]

49,823.—Steam Blower for Furnaces.—John A. Bassett, Salem, Mass., assignor to Oliver Burnett, Farming, Mass.:

I claim a steam blower constructed of the mechanical elements, and to operate substantially in the manner and by the means as hereinbefore specified, such elements being the rotary steam jet wheel, its hollow arbor, the fan wheel, and an opening or case surrounding such fan wheel, the whole being for application to a furnace, in manner and for the objects as set forth.

49,824.—Galvanic Battery.—John Blackie (assignor to himself, William C. Dodge and William S. King), Washington, D. C.:

I claim, First, The cup, B, suspended by the insulated rods, g, and plate or ring, h, as herein shown and described.

Second, I claim the perforated plate, a and a', provided with the stud, c, and nut, d, when constructed as and for the purpose herein set forth.

Third, I claim the combination of the cup, B, provided with mercury, the zinc plates, C, and the silver plate, D, all submerged and arranged to operate substantially as and for the purpose set forth.

49,825.—Machine for Covering Cord.—John Buser (assignor to Heinemann & Silberman), New York City:

First, I claim the trough, x, in combination with a series of rollers, or equivalent apparatus, to present the foundation threads to guide trough and apply to them the required tension while being drawn along said trough and twisted, substantially as specified.

Second, I claim in combination with the trough, y, the ring cover, z, with its pins for guiding the covering threads as they are twisted upon the foundation as the latter passes from the trough to the dy or spool, as specified.

49,826.—Process for Rendering Leather Water-proof.—G. Conklin (assignor to Caroline A. Conklin), Conklingville, N. Y.:

I claim the within-described process of dipping the leather, either manufactured or unmanufactured, into heated liquid at a temperature of about 175 degrees, and suspending it in an atmosphere heated to about the same temperature, substantially as and for the purpose specified.

49,827.—Machine for Making Cement Pipe.—John E. Earle (assignor to John P. Lindsay), New Haven, Conn.:

I claim raising the core in the flask during the process of filling, and only as fast as the flask becomes filled, so that the top of the core is always down in the flask at or near the point of filling, substantially as and for the purposes specified.

49,828.—Machinery for Making Cement Pipe.—William Goodwin (assignor to J. P. Lindsay), New Haven, Conn. Antedated Aug. 28, 1865:

I claim, First, The construction and arrangement of the shoe or shoes, F, with a core and flask, when the said core and shoes rise as the flask becomes filled, substantially as and for the purposes specified.

Second, The combination of the flanges, f, with a revolving head, substantially as and for the purpose specified.

Third, The arrangement of the crane, M, in combination with one or more flasks, constructed to operate substantially as and for the purposes specified.

Fourth, The combination of the crane, M, table, B, and two or more flasks, substantially as and for the purposes specified.

49,829.—Machine for Making Moldings and Frames.—Gustave Heuze (assignor to himself and Edward Sommerkorn), New York City:

I claim, First, The hand screw, q, applied in combination with the leveler, J, and belt, I, substantially in the manner and for the purpose set forth.

Second, The tubular attachment, P, to the discharge spout, j, of the box containing the preparation, in combination with adjusting plugs, I, constructed and operating substantially as and for the purpose specified.

Third, The vertically adjustable box, H, applied independently of the leveler, J, and acting in conjunction with the same, substantially as and for the purpose described.

Fourth, The splitter, L, in combination with the belt, I, and leveler, J, applied and operating substantially as and for the purpose specified.

Fifth, A machine combining a saw, a molding cutter, a leveler and splitter, and a polisher, all constructed and operating substantially as and for the purpose described.

49,830.—Picker Check for Looms.—L. J. Labounty (assignor to himself and Allen P. Bickford), Lowell, Mass.:

I claim the combination of the bunter, c, made and provided with springs, as explained, with the adjustable holding frame, B, having adjustments, substantially as specified.

49,831.—Manufacture of Super-phosphates.—G. A. Liebig, Baltimore, Md., assignor to Navassa Phosphate Co., N. Y.:

I claim the use of sulphurous acid, or muriatic acid, or chloride of sodium, as a substitute for sulphuric acid in the production of a super-phosphate from Navassa guano, or other phosphatic compounds.

49,832.—Skate.—Edgar Murray, New York City, assignor to Wm. J. Coombs, Brooklyn, N. Y. Antedated Sept. 1, 1865:

I claim the lever, e, formed with the cam-shaped clamp, f, in combination with the rod or bar, g, adjustable, as set forth.

And in combination with the said lever, e, clamp, f, rod, g, and nuts, I claim the clamps, k k, acting at the sides of the boot sole, as set forth.

49,833.—Sulky Plow.—Ira C. Pratt (assignor to himself and L. F. Pratt), Morton, Ill.:

I claim, First, The plank, A, to which the plow beams, B, are secured, connected to the draught pole, I, by joints or eyebolts, f, and operated or adjusted by the driver on his seat, through the medium of a lever and arm, or their equivalents, substantially as set forth.

Second, The adjusting of the plank, A, and consequently the plow beams and plows, higher or lower, with the axle, D, in order to regulate the depth of the penetration of the plows, by means of the plate, E, secured to one end of the plank, and provided with a series of holes, c, in a vertical line, through any one of which the bolt, b, passes into the axle, at one end, in connection with the slotted plate, C, through which the axle passes and the lever, F, attached to the plank, and bearing on the axle, substantially as and for the purposes set forth.

[This invention relates to a new and improved sulky plow, and is applicable to gang as well as single plows. It has for its object the ready adjustment of the plows, so that they will penetrate the earth at a greater or less depth, and raised entirely out of the ground when necessary, as in turning at the ends of a field, or in drawing the device from place to place.]

49,834.—Horse Hay-fork.—O. P. Secor, Chicago, Ill., assignor to C. L. Bellamy, Catskill, N. Y.:

I claim the tines, a a a, each formed in a continuous curve, in one piece, with its shanks, b, which shanks converge and are connected together at their upper ends in the described combination with the cross bars, c c', catch, e, f, springs, D, and eye, c, all constructed, arranged and employed in the manner and for the purposes specified.

[This invention consists in a novel tripping device for causing the fork to discharge its load; one which will admit of the fork being readily adjusted, so that the latter will hold or retain its load while being elevated, and which will also admit of the fork being cheaply constructed and easily manipulated.]

49,835.—Knitting Machine.—Asa Sessions, Jr. (assignor to Lamb Knitting Machine Co.), Springfield, Mass.:

I claim, First, The combination of the arm, C, hub, c, and bridge, B, with the slider, n, and bed piece, A, substantially in the manner and for the purpose described.

Second, The combination of the wire, h, or its equivalent, and the spring, k, when used in connection with the other parts of the machine, substantially as described.

Third, The spring, D, when used in combination with the other parts of the machine, in the manner and for the purpose described.

Fourth, The bridge, B, slotted as described, when applied to a knitting machine, as and for the purpose herein set forth.

49,836.—Grater for Spices and Fruits.—H. S. Shephardson, Shelburne Falls, Mass., assignor to H. S. Shephardson & Co.:

I claim punching a plate or plates for grates, so as to have a fin or lip, a throat and a conducting channel, substantially as herein described and represented.

49,837.—Sewing-machine Stitch.—J. J. Sibley, New York City, assignor to the Bruen Manufacturing Co.:

I claim the sewing machine stitch, described and shown in the drawing.

49,838.—Machine for Punching Horseshoes.—Samuel D. Turner (assignor to the Union Horseshoe Co.), Providence, R. I.:

I claim a machine for punching horseshoes, consisting of one or more elastic gage points, b b, operating in the manner substantially as described, for the purposes specified.

49,839.—Apparatus for Removing Hair from Hides.—Samuel S. Weed, Stoneham, Mass., assignor to Edgar M. Stevens and James L. Hall:

I claim, First, Removing hair and lime from hides or skins by means of a rotating cylinder covered with rubber, substantially as described.

Second, The combination of the cylinder, D, feed rollers, I and K, levers, L L, and treadle, P, substantially as and for the purpose described.

Third, The brush, W, when combined and operating with the cylinder, D, substantially as described.

49,840.—Castor Bottle Holder.—Alonzo E. Young, Dorchester, Mass., assignor to himself and John W. Haines, Somerville, Mass.:

I claim the improved manufacture of glass castor bottles holder, made not only with a disc, a plate and a flange to extend around and project below such disc, but with cups to open out of, and extend below, the disc, in manner as specified, the flange, under such

circumstances, serving to hide the cups more or less from view when the article may be in use with its stand on a table.

49,841.—Castor Bottle Holder.—Alonzo E. Young, Dorchester, Mass., assignor to himself and John W. Haines, Somerville, Mass.:

I claim, in the manufacture of the castor or bottle holder made of glass and in one piece, the arrangement of the cups, feet, connection and handle-fastening socket, as specified.

49,842.—Electro-magnetic Regulator.—François Ferdinand Auguste Achard, Paris, France:

I claim an electro-magnetic apparatus composed of a sectional ratchet wheel, A, working beam, D, double ratchet, E, electro-magnets, F, and armature, O, constructed and operating substantially as and for the purpose herein shown and described.

[This invention relates to an electro-magnetic apparatus which is applicable for the purpose of operating boiler feeds or of regulating the pressure of steam or gases in closed vessels, and which also may be used for the purpose of operating car brakes, and for various other purposes.]

49,843.—Writing Fluid.—Henry C. Bailden, Edinburgh, Scotland:

I claim the use, for the purpose described, of paper tinted or colored with a coloring matter susceptible of being acted upon by sulphuric or other destructive acid, combined with the use of an ink composed of sulphuric or other destructive acid and a coloring matter, such ink being capable of discharging and changing the color of the paper, and changing or weakening the texture thereof in the parts written upon, substantially as herein set forth.

49,844.—Breech-loading Fire-arm.—James Dabziel Dougall, Westminster, Great Britain:

I claim, First, The combination of the breech-piece, E, its recess, e, the pin, c, eccentric, b, and barrel, A, with its annular projection, f, the whole being constructed, arranged and operating substantially as and for the purposes herein set forth.

Second, The projection, i, on the breech-piece, in combination with the notch, k, in the tongue, on the underside of the barrel.

Third, The pin, l, on the breech-piece, in combination with the inclined or curved notch, n, in the breech-piece, for the purpose specified.

## REISSUES.

2,063.—Die for Stamping Rings.—Oscar M. Draper, North Attleboro, assignee of Vorgil Draper. Patented May 24, 1864:

I claim the combination of the separate, removable, centering piece, a, with the punch, C, the die, b, and the mold plates, A and B, or their mechanical equivalent, the whole being substantially as specified.

2,064.—Steam-engine Governor.—Robert W. Gardner, Quincy, Ill. Patented Aug. 14, 1860:

First, I claim the governor operated as described, namely, by using the centrifugal force of the pendulum balls to close the valve, and the gravitation of the adjustable weight on the lever to open said valve, the two forces working against and independent of each other, substantially as herein specified.

Second, The spindle, o, of the governor, supported on the head of the valve stem, but unconnected therewith, in combination with a weighted lever tending to keep the several parts in close contact, and partly balancing the weight of the moving parts of the governor, substantially as and for the purpose described.

Third, The toes, P, on the upper end of the pendulum arms, l, in their arrangement with the sliding block or cap, n, and vertical valve rod, o, constructed and operated substantially as and for the purpose described, whereby the upward vibration of the governor arm is caused to act immediately and independently to close the valve, in opposition to the influence of the weighted lever.

Fourth, The combination of the lever, p, adjustable weight, q, link, r, step, g, valve rod, e, spindle, o, and pendulum arms, l, all constructed and operating substantially as and for the purposes herein specified.

2,065.—Hoisting Machine.—William Miller, Cincinnati, Ohio. Patented May 12, 1863:

First, I claim elevating or depressing the platform of a hoisting machine or elevator, by means of traveling worm wheels, gearing with corresponding screw or jacks or segmental nuts.

Second, The combination of the described or equivalent actuating mechanism platform worm racks and worm wheels, for the purposes set forth.

2,066.—Hoisting Machine.—William Miller, Cincinnati, Ohio. Patented July 4, 1865:

First, I claim elevating or depressing the platform of an elevator or hoisting machine, by means of a single traveling worm wheel which meshes within two or more corresponding screw racks or segmental nuts.

Second, An elevating platform, supported by rollers, G, or their equivalents, on a single worm wheel, resting in worm racks or segmental nuts, substantially as set forth.

2,067.—Breech-loading Fire-arm.—B. S. Roberts, U. S. A. Patented Sept. 23, 1862:

I claim the relative position of the breech-piece hinge and spur to the line of bore by which a muzzle-loading musket may be converted into a breech-loader, which is capable of partially retracting a metallic cartridge without the necessity of cutting entirely through the stock or barrel of the arm, substantially as described.

2,068.—Breech-loading Fire-arm.—B. S. Roberts, U. S. A. Patented Sept. 23, 1862:

I claim the adaptation of arms, such as described, to the use of metallic cartridges, in combination with a hammer, a projection from the breech piece and a lock of the breech piece, when these three elements are so constructed and arranged as to prevent the arm from being fired in the usual way until the breech piece is locked against its upward tendency, caused by the pressure of the gas during a discharge of the arm, substantially as described.

2,069.—Apparatus for Carbureting Air.—Hugh L. McAvoy and Elias S. Hutchinson, Baltimore, Md., assignees of Hugh L. McAvoy. Patented Dec. 13, 1864:

First, I claim generating gas by forcing air through, or mixing it with, hydro-carbon fluid, by means of a partially submerged air-forcing apparatus, arranged substantially as described, to pass the air through the wheel.

Second, I claim using an air-forcing apparatus within a chamber supplied with air, through an automatic valve, or by any other means adapted to prevent the evaporation of the fluid when the apparatus is not in operation.

Third, I claim the employment, in connection with the vessel, A, and air-forcing apparatus, B, of a valve, H, adapted to automatically open when the apparatus is in operation, for the purpose of supplying air to be carbureted, and to close when the operation is suspended, in order to prevent the oil from evaporating, as explained.



# PATENTS

GRANTED

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[See Judge Holt's letter on another page.]

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

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The hall will be open for the reception of goods on Monday, the 25th of September.  
Goods for Competition and Premium must be deposited before Thursday Night, the 28th of September.  
Circulars, embracing details, may be had of the Actuary at the Institute.  
Communications addressed to the undersigned, or Joseph Gibson, Actuary, will be promptly attended to. W. W. MAUGHLIN, Chairman Committee on Exhibition. 3 3m

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The Industrial Museum of the Royal Wurtemberg Board of Trade and Commerce at Stuttgart; the Industrial Museum of the Grand Duchy of Baden, at Karlsruhe; and the Industrial Museum of the Town of Nuremberg have made an agreement, according to which they will receive from manufacturers and merchants of all countries objects such as mentioned below, for the purpose of exhibiting the same in turn at each of the three towns named, under conditions, offering great advantages to the contributors.  
1. Raw productions, for which new applications have been found in the art and industry.  
2. Newly invented or improved tools and machines.  
3. Newly invented or improved manufactures, which are not generally known.  
Those who are desirous of sending objects for exhibition have to apply to the Boards of one of the institutions mentioned, naming the objects to be sent in, and stating at the same time their size, weight and peculiarities, as well as their selling prices, either at the place of manufacture or at the place of exhibition, with indications as to the names of the firms of which the like objects may be ordered, and of the agents charged with the sale of the article to be exhibited.  
The reception of goods at each of the three towns named above will begin on the 1st of May, 1885, and the time allowed for each object to remain in the exhibition will be generally four weeks at each town.  
On the objects thus to be exhibited labels will be affixed, stating, in case that patents have been obtained on any of them, in which countries that have been granted, and statements to the same effect will be made in the weekly papers, published by the Boards of the said institutions.  
Manufacturers and merchants desiring to avail themselves of this opportunity of bringing their products in the shortest time to the knowledge of the people of Southern Germany, and of securing by this means a more extensive sale for them, are now invited to address themselves to one of the undersigned Boards, who will be happy to communicate to them copies of the printed sketches, containing all the particulars.  
The Board of the Royal Wurtemberg Industrial Museum, at Stuttgart.  
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DR. STEINHEIS, DR. BEEG, March, 1885. 2 2m 3\*

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**Improved Stave Machine.**

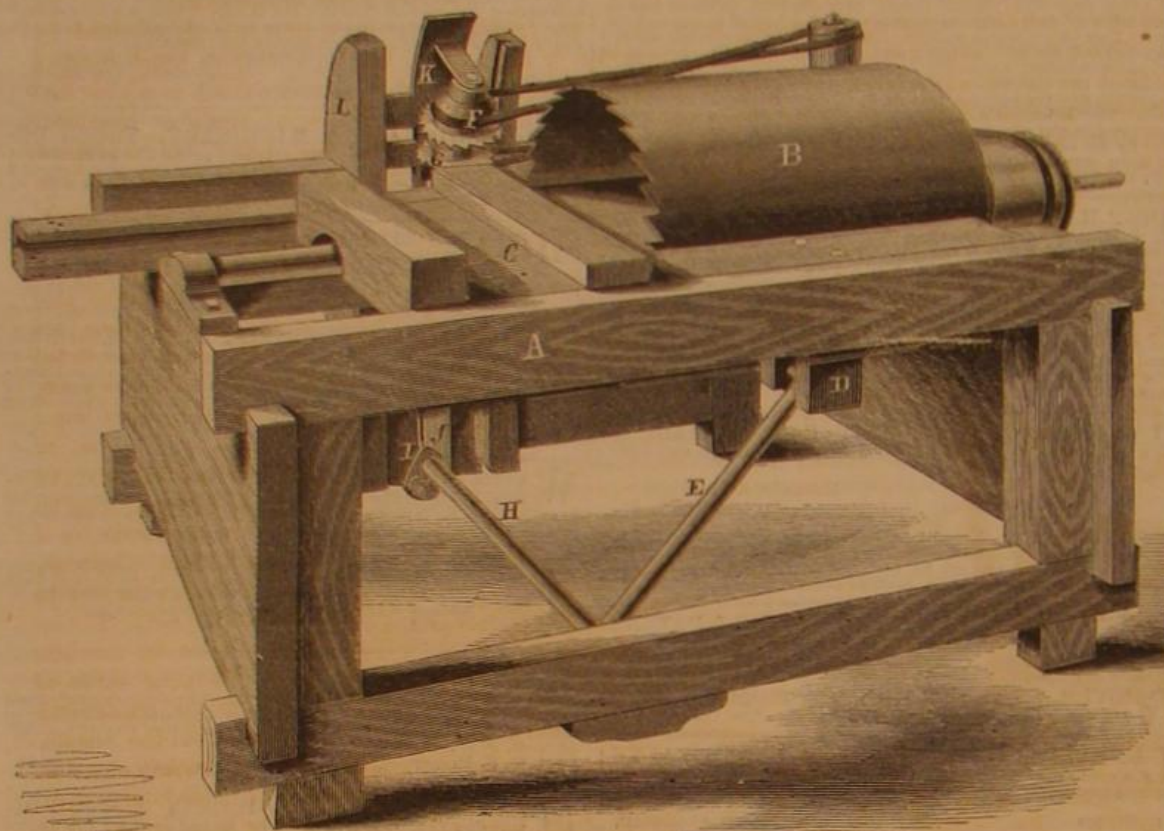
This machine is intended to saw staves for barrels and joint the edges true for any degree of bilge—all at one operation. To effect this object the inventor provides a frame, A, with a barrel saw, B. The stuff to be sawed is fastened to the bench, C, which runs inside the saw, there being a slot where the saw comes, to allow it to pass.

To the lower side of the carriage, C, there is affixed a joint, D, to which the arm, E, connects; this arm operates the saws, F and G, so as to cause them to approach or recede from each other while running. This is done by having a short double-ended arm, I, on the shaft, H; to this arm there are rods, J, connected, acting on the guides, K, to which the saw

day, Sept. 4, and was called to order by the President, E. B. Ward, Esq., of Detroit.

Returns show that the anthracite furnaces of the United States are not producing over one-third of their capacity. Thus the Government is now losing in this single branch of manufacture at the rate of not less than \$1,000,000 per year in direct tax, and far more than that sum in indirect taxes.

The large rail mill at Danville has been stopped since the first of July, on account of the low price of iron, making it impossible to work at the rate of wages required by the operatives. The annual capacity of this mill is 33,000 tons of finished rails. The managers of other large rail mills are debating the expediency of stopping their works until the cost of

**MOWRY'S STAVE MACHINE.**

mandrels are hung. These guides move in slots in the standard, L, and have the effect, in connection with the other mechanism, of bringing the saws together or throwing them apart, both motions taking place at the same time.

It is easy to see that this will produce a regular swell in the body of the stave; for as the stuff to be sawed passes into the barrel saw, the jointing saws begin to move away from each other, until the center of the stave is attained, when they close up again, thus forming a regular curve throughout the length of the stave. Any bilge desired can be sawed on the stave by simple alteration.

This invention was patented through the Scientific American Patent Agency Oct. 4, 1864, by Charles Mowry, of Syracuse, N. Y. For further information address the patentee. The machine will be on exhibition at the State Fair, at Utica, commencing Sept. 12.

**India-rubber.**

A paragraph in the *North American Review* says, there are now in America and Europe more than a hundred and fifty manufactories of india-rubber articles, employing from four to five hundred operatives each, and consuming more than ten millions of pounds of gum per annum. The business, too, is considered to be still in its infancy. Certainly it is increasing. Nevertheless there is no possibility of the demand exceeding the supply. The belt of land around the globe, five hundred miles north and five hundred south of the equator, abounds in trees producing the gum, and they can be tapped, it is said, for twenty successive seasons. Forty-three thousand of these trees were counted in a tract of country thirty miles long and eight wide. Each tree yields an average of three table-spoonfuls of sap daily, but the trees are so close together that one man can gather the sap of eighty in a day.

**American Iron and Steel Association.**

The fourth quarterly meeting of the American Iron and Steel Association convened in Cleveland on Mon-

production and the market price become so proportioned that they can run at a living rate.

Philadelphia, with eleven rolling mills, at a capacity of 26,000 tons, is now producing but about forty per cent of that amount. The steel business of that city is fitful and generally dull.

Pittsburgh, with thirty-two iron and six steel establishments, is now producing less than one-third their capacity. Twelve iron and two steel works are idle. But one of five blast furnaces in the city is in operation.

In Cincinnati, up to within the last two weeks, every branch of the trade was very much depressed, and pig-iron makers generally complained of an actual loss in their manufacture. The mills generally were running on half time, and some only continued in operation to supply certain specialties. The making of merchant iron would hardly return cost.

**FORCE EXERTED BY VEGETABLE GROWTH.**—Some idea may be formed of the force exerted by vegetable growth from the fact stated in reference to an enormous specimen, *Agaricus cartilagineus* (mushroom), which was sent to the British Museum. It was found growing below the pavement in the Goswell road, and its mycelium, or filamentous body, from which this fungus growth is developed, which, in this case, was developed into a enormous spongy mass, had, in pushing up its many-headed pileus, raised a stone weighing two hundred weight, and measuring four feet square.

**PRICE OF CHAMPAGNE IN PARIS.**—In the U. S. District Court, San Francisco, W. B. Farwell, late Naval Officer of that port, testified that he went to Europe under the instructions and at the direction of the Treasury Department at Washington, for the purpose of ascertaining the value of wines at the place where manufactured, and as a part of the result of his observations, ascertained that the "Eugene Cliquot" champagne sold in jobbing lots in Paris at 7 francs (about \$1.40) per bottle for the best quality, and 5 francs (about \$1) per bottle for the next best quality.

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will continue to receive careful attention, and all experiments and practical results will be fully recorded.

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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 PATENTERS AND INVENTORS.

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