SCIENTIFIC AMERICAN

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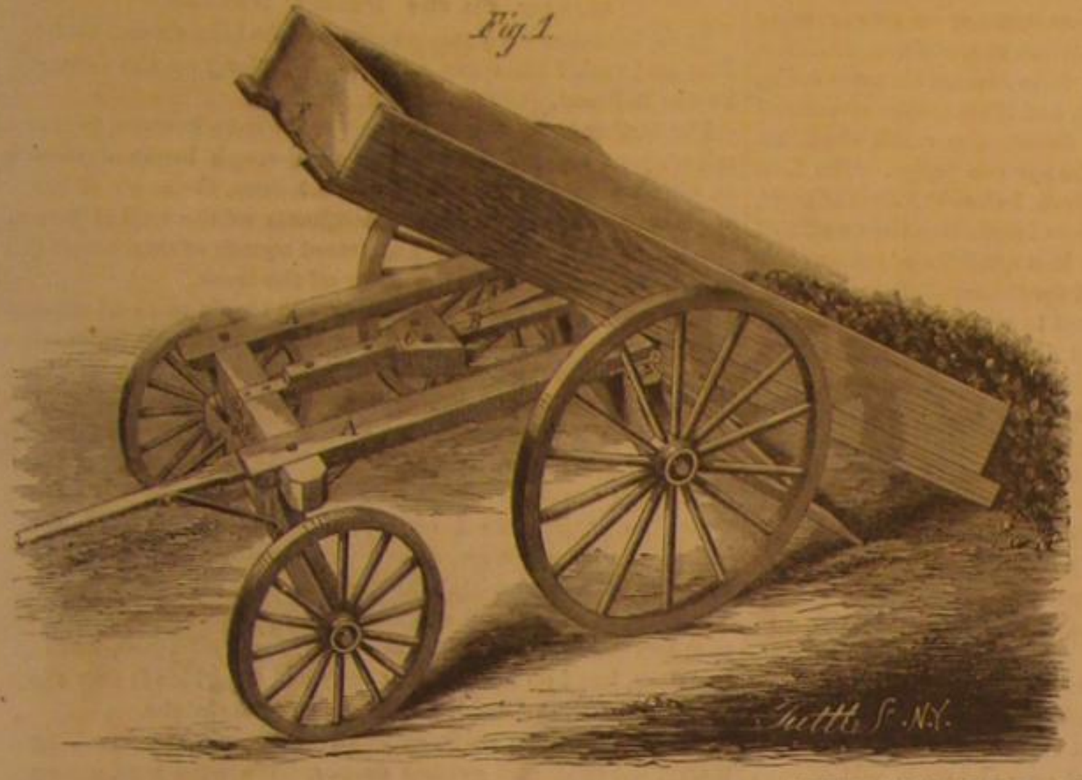
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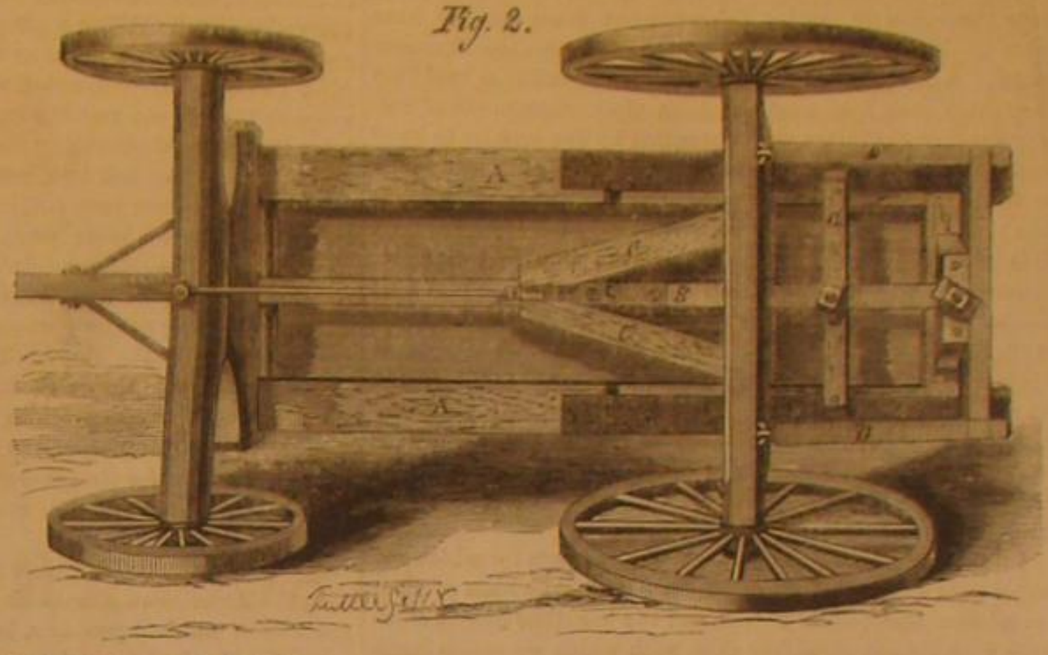
NEW YORK, JUNE 15, 1867.

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Improved Dumping Wagon.

Loads of coal, stone, gravel, etc, carried in a box wagon or a four wheeled vehicle, must be removed by the shovel or hand, a slow and laborious process. Two wheeled carts only, can be tipped to discharge the load in one heap, but carts are hard upon the horse and do not have the capacity of wagons.





MUNGER'S IMPROVEMENT IN WAGONS.

To remedy these defects the wagon seen in the accompanying engravings has been contrived, and its operation is all that could be desired.

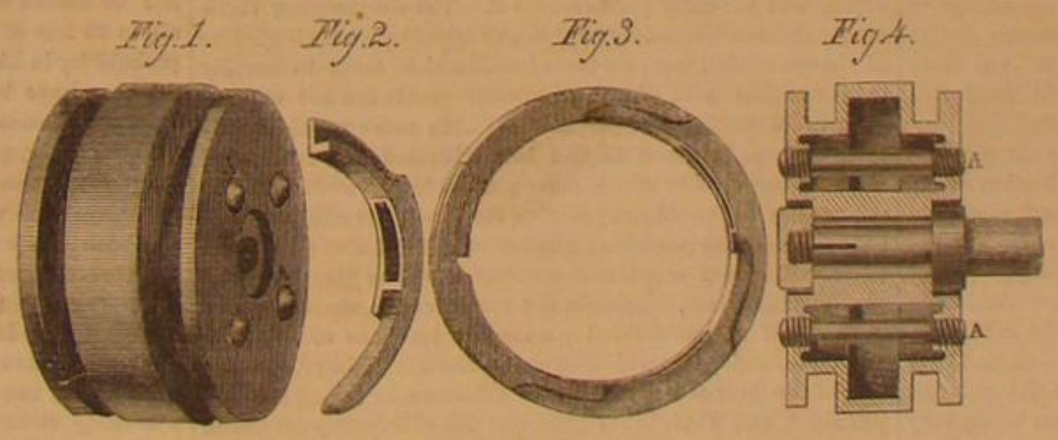
Fig. 1 shows the wagon in the position of dumping a load, and Fig. 2 is a view of the under side showing its peculiar construction. The hind axle, instead of being rigidly secured to the body, is made to slide on the frame. The side bars, A, of the frame are hinged at a point near the center, the back part forming a portion of the wagon body. On the side bars of this portion the straps of the hinges extend to the back end. On these iron straps the rear axle slides, its movement being facilitated by rollers set in the bolster or upper portion of the axletree. A central longitudinal bar, B, also hinged in line with the side bars, serves partially as a guide to the axle from which two diagonal braces, C, extend to the central bar. A brace also passes from this bar to the king bolt on the forward axle. The braces where they converge, embrace the central bar as seen at C, Fig. 2. A frame, D, same figure, is hinged to the back of the rear axle, and when this axle is in place is held to the body by a button, which thus thus keeps the axle in place and holds the body and frame snugly together by the aid of a hook, E, on the forward bolster which catches into a staple on body front at the F, Fig. 1. The wagon is now in position for drawing a load.

When the load is to be dumped the frame, D, at the rear of the axle is unfastened and allowed to fall with its end resting on the ground as a brace, seen in Fig. 1, the front hook is unfastened, and the horses backed, which runs the body back on the rear axle until it has passed the central hinges when a very slight effort will tip the body and deliver the load. To return the rear wheels to their former position, block them in front and start the team. In Fig. 2 is seen a cross bar, G, with a button by which the rear wheels may be held in the position shown in Fig. 1, if it is desired to draw a light load and discharge it without sliding the rear axle. A patent was granted for this combination Feb. 12, 1867, to George N. Munger, of New Haven, Conn. For further information address all communications relative thereto, to A. D. Platt 158 Broadway, New York.

Improved Engine Piston.

The use of the steam itself as a spring to keep the packing rings of a cylinder piston out to their work, is gradually superseding the employment of setting-out springs, and when the steam can be made to act with the pressure, is certainly an improvement. The engravings are views of such a piston which, if extended trials and the opinions of practical men are of any value, is a vast improvement on the piston and rings ordinarily used. The inventor claims that the rings adapt themselves better to any irregularities in the bore of the cylinder than other rings, and also when, as in those of steam hammers, one end is worn larger than the other; that it is always steam tight in cylinders of regular form, making a saving in fuel, as no steam can escape before having done its work; that there is less friction than with the common piston, as it is always in proportion to the pressure of steam.

Fig. 1 is a perspective of the piston with the segments of the ring removed. Fig. 2 is one of the segments, Fig. 3 the segments placed in position, and Fig. 4 a section through the piston. The piston is a single casting, cored, and having no follower to be bolted on. The coring between the hub and the periphery renders it light, while the screw bolts, A, which pass through it and are riveted on the outside, strengthen it and close up the holes left for the support of the cores, steam tight. The piston rod has a collar on it, seen at B, Fig. 4, which may be either recessed into the piston as in the engraving, or may come square against the outside or head. The rod for the piston of a horizontal cylinder, passes through a hole oval in form—seen in Fig. 1—by which the piston can be shifted up or down to keep the rod always in the center of the cylinder. When an engine has been run a long time and it becomes necessary to remove the piston from the rod, the nut which secures it, is sometimes corroded on the thread so that it is difficult to start it. To remedy this difficulty the inventor of this piston cuts a slot



WHEELOCK'S PISTON AND PACKING RING.

in the end of the piston rod, as in Fig. 4, which allows the thread to "give" or spring in the act of unscrewing the nut. If salt or brackish water is used, this slot might become closed, and to prevent this a cap nut is used.

The form of the segment rings is seen in Figs. 2 and 3, and their peculiar joints are represented where joined in Fig. 3. This form allows free action, as on hinges, between the sections, so that they can adapt themselves to the irregularities of the internal surface of the cylinder. They are of cast iron, the joints being milled and the face and edges turned. By reference to the engraving it will be seen that where the joints approach, a slight bevel is cut which allows the steam to pass behind and under the segments forcing them outward and also holding them firmly against the inner face of the annular groove. For this purpose the bosses of the heads are turned somewhat smaller than the center boss which fits the cylinder. As these beveled channels are toward the outside of the piston it will be seen that in moving in one direction one set of rings are packed, and in the other direction the other set engage with the cylinder surface.

Patents were granted for this device April 5, 1864, Nov. 28, 1865 and April 23, 1867, to Jerome Wheelock. For further particulars address the patentees and manufacturers, Wheelock & Wheeler, Worcester, Mass.

Science Familiarly Illustrated.

The Province of Plants.

Disease and even death have been said to be caused by sleeping in rooms with growing plants. A knowledge of botany might show this opinion unfounded and lead to the invention of a more plausible reason. A familiar discourse on the office of plant life in the economy of nature may not be uninteresting to our young readers.

Among the constituents of the air is carbonic acid. This gas is unceasingly generated in those regions of the earth where volcanoes are now, or were in a former age active; in all ordinary combustion; in the decay and putrefaction of animal and vegetable substances; and in the respiration of men and animals, for in breathing, the oxygen inhaled combines in the body with carbon, thus constantly deteriorating the air by removing the free oxygen or vital air, and creating an excess of carbonic acid. If all the gas thus formed should accumulate, it would speedily destroy animal life, as witness the fatal results when it is collected in deep wells or, under the name of choke damp, in coal mines.

To maintain the proper equilibrium in the atmosphere is the province of the plant kingdom the principal means for whose support being the carbonic acid exhaled by men and animals as useless, but which is absorbed by them and in its place an equal bulk of life-supporting oxygen is given out. Every wind carries the poisonous carbonic acid to the plants, it is taken in through their thousand stomates or breathing pores, it combines with the elements of water and is elaborated into organic matter, thus furnishing food first for the herbivores, then for the carnivorous animals that feed upon the herbivores. So then all our food is either directly or indirectly derived from the plants. The round is completed after the food is digested, has entered into the blood and becomes finally decomposed into carbonic acid and water, and exhaled from the lungs, to be again taken up by vegetation.

Plants also draw nourishment from the earth, and as we have already seen that flesh is formed from the vegetable world, so now we may affirm that the earthy matters of the bones, the iron and other mineral matters in the blood are derived from the same source, so that animals depend absolutely upon plants for their very existence and the great object for which the vegetable world was created seems to have been to stand between the animal and mineral worlds and organize portions of the former for the sustenance of the latter.

BESSEMER STEEL WARE.—It has lately become a familiar test of a certain quality of Bessemer steel, to press a cold plate of it through a tubular die, producing a smooth and flawless cup or pail. This experiment suggests a valuable manufacture for domestic purposes. All kinds of hollow ware made of such metal, being without seam, and much less affected by oxidation, acids, heat etc., than common iron, would be more economical at a higher price. At the same time, the higher value of the steel per pound might be nearly or quite balanced by reduction in the cost of manufacture and the weight of metal. Russ of Gratz, it seems, has commenced this manufacture, though to what extent we are not informed.

Special correspondence of the Scientific American.

THE EXHIBITION OF IRON AND STEEL.

PARIS, May 7, 1867.

THE BESSEMER PRODUCTS—SUCCESS OF THE SWEDES.

Those interested in the iron manufacture and in the progress of the Bessemer process, will find much in the Exhibition to interest them. The circle next inside of that devoted to machinery is in most cases chiefly devoted to metallurgical exhibitions. Many of specimens present little that is of interest, but there are some that are deserving of attention. In the Swedish department there is one of the most instructive collections of specimens of Bessemer steel containing different per centages of carbon. They are in the form of round bars which have been torn asunder by Mr. Kirkaldy's testing machine in London, to ascertain their relative tensile strength as well as their ductility. The number of bars is quite large and the experiments appear to show that nine tenths of one per cent of carbon gives the greatest tensile strength. Above that proportion the steel loses tenacity, as it approaches the condition of cast iron. A number of small bars are broken across to show the difference of fracture caused by repeated meltings, up to fifty times. The change due to this cause appears to be very slight, while that consequent on the varied proportions of carbon is of course very great. The Swedes have succeeded in accomplishing what many makers have been unable to do, viz., to draw fine wire from the Bessemer metal. A large coil of No. 47 is shown, and it is said that they draw even finer numbers than that. Specimens of cutlery are also exhibited, and warranted by the makers to be of excellent quality. A model is shown of a calcining kiln much in use in Sweden, and with which any percentage of sulphur less than four per cent may be wholly expelled from the ores. It is much higher than usual and tapers to a less diameter towards the top. It is fed with gas from the furnaces near the bottom, air being drawn in through holes in the brick work at intervals for a considerable portion of its hight. A high temperature is attained, the heat being as great as can be employed without agglomerating the ore, and doors are provided near the tweers by which in case of partial sticking together of the ore it may be loosened. The charge is drawn through doors at the bottom. Of course the display of ores is very fine from this country.

In the Russian department the only objects for which the exhibitors can claim superiority are horseshoe nails of their usual excellent quality of iron, and the beautiful Russia sheet iron with its non-oxydizing skin, with which we are so familiar in America, but which is so little used elewhere.

THE FRENCH METALLURGICAL DEPARTMENT.

The most remarkable exhibitions by French makers are contained in special buildings in the grounds. In one of these Messrs. Petin, Gaudet & Co. exhibit two halves of a large steel ingot weighing 25 tuns, which has been broken across to show the fracture. It appears remarkably free from the porosity generally existing in these ingots before hammering. A steel crank-shaft weighing 7½ tuns and about 18 inches in diameter is also exhibited, and a steel gun of 9½ inches bore and 16 tuns weight, besides a number of other articles of steel, as shot, rails, tires, etc., representing the usual branches of this manufacture. The display of iron is equally interesting. There are a number of rolled girders of varying hights, from 3 feet 3⅜ inches downward, and of lengths increasing as the hights diminish, the weight of each specimen being not far from 2½ tuns. A rolled engine-beam 36 feet long, 5 feet 11 inches wide in the center, and 2½ inches thick, is also shown. This firm, who have been able to compete very successfully with the large Sheffield makers of armor plate, exhibit a plate weighing nearly ten tuns and approaching very nearly in thickness to the crop end sent by Messrs. John Brown & Co., being 11⅜ inches thick. The quality of iron produced at these works is very good. The ore is largely brought from Sardinia, and some fine specimens of this are exhibited.

On the opposite side of the main entrance to the grounds from this building is another, containing the collection of objects sent by the Compagnie Anonyme des Forges de Chatillon Commentry. The works of this company are among the most extensive in France, and the amount of iron produced, I am informed, is about one twelfth of the total production in the whole country. The most remarkable object in the collection is a rolled girder, of which a number were made for some docks at Bordeaux, of the extraordinary hight of 3 feet 7½ inches, the width of the top and bottom flanges being very nearly 12 inches. Another piece, of the same section has been curved in a vertical direction. These girders are not welded, as some might be inclined to imagine, but have been regularly rolled from piles formed of suitable slabs. The same company also send specimens of armor plate, but though of what would but a short time ago have been considered remarkable thickness, they do not approach those exhibited by the last mentioned firm or the English makers. Whether their rolls are heavy enough for such sizes or not I do not know.

At a little distance from these is another building devoted exclusively to the products of the works of Mr. Schneider, at Creusot. In addition to two large machine engines, and a fine winding engine for a mine, which I shall have occasion to mention in a future letter, there are some very interesting specimens of iron and steel. The exhibitor has shown great judgment in the arrangement of the pieces. They are divided into classes according to the percentage of carbon contained, or the process by which the manufacture has been carried on, whether it be by puddling or the Bessemer process, by squeezing or by hammering in the subsequent treatment, or finally whether the hammer or the rolls have been employed to produce the finished article. In each class he gives first a specimen of the primitive bloom and then successive samples showing the condition of the material in each stage of its working. A number of iron rails are exhibited, broken so as to show the fracture, but though there are some that look very well, the majority appear too soft for proper durability. Accompanying his exhibition of products are very interesting models showing the entire arrangement of the various buildings composing the works, with the facilities for the shipment of goods by railway. The walls are also hung with diagrams and tables illustrating the system of education for the children of the operatives in schools connected with the establishment, and also other matters of interest, such as the average prices of labor of all kinds, separately and collectively, for each year since the works have been in operation. This is very simply and clearly represented by diagrams, and the gradual and almost uniform increase that has taken place is very noticeable.

THE BRITISH IN DEFAULT.

In the British department it seems as if the objects exhibited hardly represent fairly the state of the iron and steel manufacture in that country. There is nowhere any imposing display, and with a few exceptions nothing that is not equaled by articles sent from other countries. Many of the most prominent makers have sent little or nothing, relying on their already world-wide reputation to sustain their claims to notice. Thus, I find nothing from Messrs. Cammel & Co., of Sheffield, while the Bolton Iron and Steel Company content themselves with sending a plain locomotive crank shaft, remarkable for nothing as far as the eye can judge. The Low Moor and Bowling companies, which, before the days of steel, stood so high in the manufacture of locomotive tires, and still have the credit of producing the best qualities of boiler plate and other kinds of soft iron, send specimens of their products, some of which have been subjected to severe tests of flanging. In one we have a plate pressed into the shape of a high crowned hat, in another a thin sheet has been folded over a number of times in directions at right angles to each other without cracking at the corners, and other similar tests designed to exhibit the thorough tenacity of the iron. In addition to their iron they also show specimens of their beautiful coal, which has so much to do with the excellence of the former. The exhibition of the Earl of Dudley's works is also worthy of notice for the good quality of the iron and the variety in its characteristics, from very soft to crystalline or steely.

AMERICAN MINERALS.

In the American department little or nothing is shown in the way of finished products, but there is a fine and well arranged collection of specimens of ores and coals which give some idea of the natural capabilities of our country for this most important branch of industry. SLADE.

The American Lattice Bridge.

It may be considered as a generally received opinion among engineers of the present day—since it is even tacitly conceded by its once strenuous opponents—that the open web girder offers superior advantages, upon the whole, to the older and more solid sided form. Were any proof required of the general favor with which they are now regarded by the profession, two out of three large bridges erected would bear witness to the fact. When, twenty years ago, a commission was appointed to inquire into the application of iron to railway structures, its verdict respecting the open web form was that "lattice girders appear of doubtful merit," and Mr. Fairbairn in one of his works expresses a nearly similar opinion. In spite, however, of all the cold water thrown upon the new claimant for engineering consideration, it has continued steadily to make way; and it is interesting, and not a little amusing besides, to contrast its present position with that which was virtually predicted for it. The disparaging statements and condemnatory arguments urged against all girders of the open-sided form on their introduction, serve to forcibly point out that men of scientific attainments are not exempt from those foibles and prejudices which some people fondly imagine are confined to the less educated and instructed world at large. The commission was evidently wedded to the old system and could not perceive that their favorite example embodied all the particular attributes and features of the ancient methods of construction. Any one who glances at the wo different forms, beholds in the cumbersome, shapeless proportions of the solid-sided girder, the presence of that solidity and massiveness which formed a distinguishing characteristic of the days when science was unknown, or at any rate unpracticed, and when brute force was the sole power employed to counteract and resist the action of external agents. In the open web beam we recognize a worthy offspring of scientific construction. It resists the action of the strains brought upon it, not *en masse*, as in the case of its older rival, but by that due proportioning and accurate adjustment of all its various parts which can alone impart to a structure the appearance of lightness and elegance; while at the same time it bestows upon it all that strength and rigidity inseparable from the duties it has to perform. The open-web girder, which, in its widest signification, includes all those classed under the various denominations of triangular, trellice, lattice, and truss, was borrowed by us from our ingenious transatlantic brethren who were first to erect some splended timber bridges upon this principle. They possess at the present day numerous gigantic examples of this method of construction, embodying every principle, with the exception of that of suspension, which could possibly be introduced in the erection of timber spans. It must not be supposed that the form of girder in question sprung into full developement upon its first appearance among us. Far from it. The earliest examples of wrought iron open-sided girders were erected in Ireland. We may select as a specimen of their original construction a bridge carrying the Dublin and Drogheda Railway over the Royal Canal in Dublin. However worthy of commendation as a pioneer of the new principle this bridge may be considered, it cannot be otherwise regarded than as a miserably inefficient application of it, or rather as no correct application whatever. The web wherein lies the especial value of the system, is composed of a series of thin bars closely interwoven and riveted together, so closely as to present a completely reticulated appearance, and without the slightest attempt at proportion or distribution of material, and constitutes a perfect mockery of all the laws laid down by theory for correctly designing girders of this nature. Curiously enough, about thirty miles further on, upon the same line of railway, we have in the Boyne Viaduct one of the finest existing examples of the lattice principle, where the laws of theory have been closely adhered to, and only received that modification which must always accompany their practical application. Comparing these two structures together and contrasting the total absence of all scientific principles and theoretical requirements in the one, with their full and accurate development and application in the other, it is scarcely possible to believe that the two designs could have emanated from the same individual.—*The Engineer.*

Winter on the Pacific Railroad.

Snow in scattering patches enlivened the hills around Dutch Flat, and varied the scene as we rolled along on the Central Pacific Railroad.

The further on we moved the deeper the snow became; twelve miles ahead and we were rolling on through banks of snow on either side from five to seven feet deep, the space of the track being cut out with the smoothness of the wall of your room. Along the road were scattered squads of men keeping it in repair and keeping the snow off the track.

We were now approaching Cisco, and for six to eight miles it seemed we were traveling between great gorges, as snow stood on an average six or eight feet above the tops of the cars, and in places 100 feet or more above the track, and almost perpendicular. It looked terrific—certainly grand; and to think I was on the Pacific Railroad, the boldest work of the age, added a majesty to the scene and a pleasure to the mind which language cannot convey. As you look back on the railway canal as it were, daringly cut through mountains of snow, it spoke in unmistakable language that it is only to possess the will to do, and anything can be accomplished. We soon arrived at Cisco. Here the snow, I was informed, was 15 feet deep, but I do not think it exceeded ten. This is now the terminus of the railroad, and here you take sleighs.

We jingled along gaily, all enjoying the scene and making merry, the snow still getting deeper. We were now riding on top of it, and its depth could only be estimated by the telegraph poles, which are 24 feet long. At times the wire was entirely submerged, and then the poles would stick out, it may be two, four or six feet. Now and then along the roadside you could see a chimney of some lone cabin sticking out and seeming a minature smoking volcano, or an incline tunnel cut down to some farmhouse.

We reached the summit, and what a scene! I thought snow scenes on Lake Superior were beyond competition, but the scene of the summit of the Nevada baffles all description. At this locality are a number of buildings, some entirely covered over with snow: others set up on posts, with two stories and a sharp peaked roof, have the extreme part of the peak sticking out. The snow here is from 27 to 30 feet deep, and in some places double it. The mountains are almost spotless white. Notwithstanding the depth of snow, there are quite a number of Chinamen and other individuals walking around, and who all at once at times drop out of sight, like ground squirrels into their holes. I must not forget to mention one shrewd *hombre* who rather conceived the idea that he would not be buried up altogether, and built a cabin on the top of about 20 feet of snow, propping it up as the snow falls. The probability is his real estate will fall some about next July.

There have been, about the summit, several snow slides, in one instance burying, some say 30, others 60 Chinamen. The towering, ponderous bodies of snow speak loudly, "beware of my power if I start." Snow slides, when they move, are worse than whirlwinds; they are typhoons, earthquakes and whirlwinds consolidated. They make a clean channel as they move; immense trees are but pipe-stems, and ponderous boulders are carried along as pebbles. They can be likened to shooting stars in their speed.—*Corresp. Bulletin.*

The Sacramento *Union* says of the winter's work:—The first great fall of snow was easily managed, though before the line was fairly restored, other storms broke upon the mountains, and from that time until the middle of March, the snow plows were kept in almost continual service. The winter was one of the fiercest ever known in the Sierra Nevada. Snow fell five days of one week. Yet the railroad men persisted, determined to prove that even in this terrible season, without the instruction of experience, and bothered by the settling of a new road bed, they could run trains to Cisco. It was found that with the aid of the big independent snow plows, where the track was not walled in by rock and earth, the result of the heaviest storms could soon be cleared away, the bulk of the snow being thrown into the ravines. The greatest difficulty was in the deep cuts. The freight cars which came into Sacramento loaded with snow, have borne witness to the kind of work done in clearing them. The railroad men have decided on covering the cuts, and have adopted a plan for strong roofing structures.

ECLIPSE OF JUPITER'S MOONS.—On the 21st of August next a celestial phenomenon will be witnessed which has only twice before been recorded in history. The planet Jupiter will at that date be seen unaccompanied by her satellites for nearly two hours. Of her four moons three will be invisible on account of their passing simultaneously over Jupiter's disk, and the fourth will be immersed in the shadow of the planet.

Editorial Summary.

THE STEAM GUN CARRIAGE.—A further trial of Mr. Ead's gun carriage was made on the 18th ult., in the presence of Admiral Farragut and a number of high officers of the army and navy. Twelve shots were fired (with the 15-inch gun) in exactly 16 minutes. The steam shot-elevator had been deranged in some manner, and was not used: in consequence of which, the inventor thinks, the firing was not more than half as rapid as it might have been. The steam check to the recoil was tested with a number of heavy discharges, one man controlling the gun with ease. The pressure created in the cylinder by the heaviest charge was between 750 and 800 lbs. to the square inch. The heating of the gun with this rapid and heavy firing, was very slight—an important and rather unexpected result. The interior surface, as far as the arm could reach, was barely warmed, and the exterior seemed as cool as before. Greater confidence is now felt in the endurance of these great guns, than ever.

EARTH WORMS.—Another correspondent adds the testimony of his own observation, to the curious mode of eating grasses and leaves, detailed in a communication which our readers will remember. He adds one or two curious observations further:—"The worm exudes a transparent, sticky substance, which serves it for taking hold on objects to be conveyed to its hole, and also as a means of finding its way back to the hole, by the slimy trail. Although the worm cannot see, it can hear very well; a very moderate noise at the distance of three feet causing it to contract and attempt to hide. It would also seem that the worm is very sensitive to warmth. With a small stick I could touch it before it was aware of anything being near it: but in cautiously putting my hand toward a worm, it would contract its body when my finger was an inch from it. It would seem from this that the warmth of my hand made the worm aware of its approach."

THE COMMON SNAIL, which seems like little more than a jelly, is furnished with quite a firm jaw of a crescent shape, on the upper lip. In some species this jaw has a slight smooth projection on the cutting edge, and in others it is notched. It is capable of biting through the leaves of lettuce or cabbage, and when feeding, the nipping sound of the bite can be heard, and the little semicircular cuts on the leaf are distinctly seen. But the more curious part of the eating apparatus, is the tongue with which the snail laps its softer food, and which is also furnished with sharp, hooked, rasping denticles to the incredible number, in some species, of nearly 12,000, arranged in regular longitudinal and transverse rows, on a bit of membrane not a quarter of an inch long and half as wide. A wonderful vitality is found in these creatures for reproducing portions cut away, and sometimes even the head grows again after decapitation.

COPPERING IRON HULLS.—A correspondent calls attention to Barnard's (American) patented mode of coppering iron hulls, by means of rivets headed in a chamber reamed out within the thickness of the iron with a one-lip drill: the sheathing being laid in a patented insulating paint and cement. He states that Mr. Barnard went to France in 1864 at the instance of the Government, to superintend the sheathing of one of its iron hulls in this way, and asks if we have not confounded Barnard with Bernabè. By referring to our original notice, it will be seen that Bernabé's patent is even more distinct from Barnard's than his name: being of the kind the French call *galvanoplastique*, and relating to the chemical precipitation of copper upon iron.

MISCELLANEOUS.—Americans in China have secured for American steamboats the exclusive use of two of its rivers. The British there cannot furnish the equal of our boats in speed, and so have been shut out, which has awakened quite a breeze.——An ordinance for paving a portion of Seventh Avenue, New York City, with the Stafford (wooden) pavement has been passed by the Common Council. The Mayor's decision is reserved.——The first steam fire engine in China arrived there in March last, and does so well that more are about to be ordered.——The population of London is estimated by the Registrar General at 3,082,372; Liverpool, 492,439; Manchester, 362,823; Birmingham, 343,948.

GREAT ESTABLISHMENTS.—The French have a notable genius for mammoth incorporations in manufactures as well as finance. Their great industries are consolidated in fewer and vaster establishments, relatively, than in any other manufacturing country. The celebrated works of Schneider & Co., Creusot, turn out one eighth of the whole iron product of France, and employ 10,500 workmen. Chatillon yields one twelfth, with 8,900 workmen; Petin, Gaudet & Co., a still larger proportion, with 7,000 to 8,000 men.

THE PRUSSIAN Navy is set down by a French journal at 78 ships carrying 453 guns; two being iron clad. But British builders are now making for Prussia at least three powerful plated ships of war. Mr. Reed, chief constructor of the British navy, who furnished the model for the Wilhelm describes that vessel as the most powerful ever laid down in any country. She is nearly 6,000 tuns burden, with 1,150 nominal horse-power, and has iron armor plating 8 inches thick.

NEW WAY TO MAKE POTASH.—A process hitherto confined to the laboratory, has been introduced on a practical scale by M. Tessié de Mothay, advantageously replacing sulphuric by fluosilicic acid in the manufacture of potash. The acid is obtained from carbon, silex, clay, and fluoride of lime, melted in a blast furnace.

INDIUM.—This new and scarce attainable metal has been produced in decidedly perceptible quantity by M. Reichter, who first succeeded in isolating it. M. Reichter lately presented to the Paris Academy of Sciences two prism-shaped specimens of indium, about four inches long, with sides one-half and three-fourths of an inch wide. It is obtained in faint traces, in a precipitate derived from the solution of zinc in sulphuric acid. Its presence in zinc and its close resemblance to cadmium, which also accompanies the ores of zinc, have led to the conjecture that these two obscure metals are the same. The distinctive traits of indium, however, leave no doubt upon this point, its only known oxide, unlike that of cadmium, being insoluble in ammonia, and its spectrum being distinguished by a bright indigo ray. Its color, smell and other properties somewhat resemble those of tin.

SELLING OFF THE IRON CLADS.—The money articles inform us that ten millions of francs in foreign exchange made their appearance in our market the other day, in completion of the purchase money of the *Dunderberg*. With the preceding instalment, it is understood the builder realizes something over $3,000,000 currency.—It is also understood that the French Government has completed the purchase of one of our smaller iron clads, now in European waters, and that five million francs further will presently rejoice the heart of Wall street.—The Japanese Commissioners, it is reported, are to purchase the ex-rebel iron clad ram *Stonewall*, if a survey proves satisfactory, for $400,000.—Finally, it is rumored that Russia takes the *Miantonomoh* and a few other unconsidered naval trifles, on general account. We have a few more left for prompt applicants—"selling out to make room for new stock."

——We regret to observe that the prize of $20,000 offered by the French Academy for a solution of the nature and remedy of Asiatic Cholera, has not been won. A number of gentlemen were awarded partial prizes for valued contributions to the object.——Philadelphia boasts the largest music hall on the continent. Horticultural Hall, just opened, measures 75x 200 feet, giving 15,000 square feet of floor. The Boston hall has 10,206 square feet, Irving Hall, New York, 9,375, and Steinway Hall 9,125.

GLASS PRINTING.—De Mothay has prepared an ink for printing on glass by means of rollers similar to those used in calico printing, after which the glass is subjected to heat and the picture is vitrified and fixed in the glass, without producing any distortion or imperfection. Many thousands of plain patterns and mosaics of stained glass produced by this process at a very cheap rate, are already in use for the decoration of church and other windows. The colors are mixed with a solvent of a silicate or silico-borate of potash and lead, as usual in painting on glass, and this composition rendered plastic by resin in turpentine, is applied thickly to the rollers and transferred to the glass, after which it it is vitrified in the usual manner.

FLAT STREET RAILS.—The obstinate prejudice of the English against street railways, leads to a discussion at present of a compromise plan. It is proposed to lay two pairs of nearly flat rails with a slight depression centrally for omnibus wheels, and a guide rail midway for the driver to sight with the pole of his carriage, so as to keep the track. The suggestion is not new, but it is worthy to be thoroughly tried and perfected. We shall not have the perfection of city travel, until a public roadway free to all, to which ordinary vehicles may be adapted, offers no resistance to the movement, turning out and passing of conveyances.

PHOTOGRAPHY IN 1787.—In a book printed in 1787, entitled "Rational Recreations in Natural Philosophy," by W. Hooper, M. D., occurs a paragraph headed, "How to print letters by sun light." The directions given are, to fill a glass decanter with a solution of silver, mixed with chalk and aquafortis of the consistency of milk. Then having pasted paper models of the shape desired, on the outside of the decanter, and placed it in the sun, the glass will turn black, leaving the space occupied by the paper white. In 1802, the action of light upon silver salts was applied to producing images of leaves, lace, etc., on white leather or paper, by Wedgewood and Davy.

A MONUMENT TO PROFESSOR BACHE is projected at Washington, and a committee, including his successor, Prof. Peirce, Prof. Henry of the Smithsonian Institute, Admiral Porter and other distinguished gentlemen, are moving in the matter. The Boards of Trade in the seaboard cities, realizing the obligations of commerce to the man who made the Coast Survey what it is, are coming forward to second and promote the proposal, which will no doubt be promptly and properly carried out.

CONCILIATION.—A clergyman's mode of rat catching as described in an exchange, is worthy the attention of Mr. Henry Bergh. He uses a wire cage trap, and when a rat is caught, instead of incontinently killing him, he treats his prisoner liberally with food and drink, until he is fat, tame and contented. Others will then crowd in to share his good fortune, (if he is not large enough to drive them away) and may be removed at leisure and despatched.

THE THIRD ANNUAL EXHIBITION of the Middlesex Mechanics' Association will be given Sept. 10, 1867 at Lowell, Mass. For further information address Hocum Hosford, Superintendent, at the corner of Middle and Shattuck streets Lowell, Mass.

THE ADDRESS of Lamb Cook & Co., manufacturers of Oliver A. Kelley's water wheel governor, illustrated in No. 19, current Vol., page 296, is at Slatersville, R. I.

A Dam Built in Midwinter.

Among recent engineering operations, the construction of the dam at Turner's Falls, Mass., on the Connecticut river, in the depth of winter, is somewhat interesting. The channel being divided by an island, the work, a dam of 23 feet in hight and 900 feet in length, was built in two sections, one after the other; an opening twelve feet lower than the dam and 200 feet wide having been left in the middle of the first section, for the passage of the current while the second section was building. But before the second section had been completed (which was done by the middle of December last) a freshet brought down a raft of timber against a wooden barrier erected to guard the opening left in the first section and to facilitate finally closing it, and sweeping away this structure, tore out the foundations of the dam below the opening, down to the bed rock, for a breadth of about 110 feet.

This breach must be repaired at once or the whole remaining work was liable to be swept away by a freshet at any time in late winter or spring. The ordinary flow of the river through the breach was 5 to 8 feet deep, with a velocity of 10 to 12 feet per second, and a volume as estimated, of 5,000 to 10,000 cubic feet per second. To turn the water out of this channel, that the masonry might be laid in its bed, a provisional dam was constructed of timber cribs, bearing against the stream in the form of an arch, and spanning horizontally the breach. The first crib or pier was towed into position on the 31st of December, and sunk by filling with stone. Ten such piers were placed at equal distances, ends against the current, as radii in a segment of a circle, and the last was in position on the 16th of January, 1867; the current still flowing freely between them. The passages were now to be closed by a second set of piers, tapered to fit the convergence of the first set, and serving at once to key and fill the arch, which then presented a front to the current only consolidated the more, the greater the pressure brought against it. The last of these plugs was put in on the first of February. Nothing remained but to fill in and tighten the barrier, after which the dam was laid in perfect security, commencing March 1st and finishing on the 22d of that month. The work of filling in was interrupted by high water for a few days in the middle of February, and two piers had been lost while floating them to their places, by the breaking of guys: but with these exceptions no mischance occurred, and notwithstanding the severity of the season and the arduous nature of the work, no loss of life, personal injury or unusual sickness was suffered among the seventy men employed. Both the process and the result reflect great credit upon the agent, Mr. Geo. W. Porter, and the superintendent, Mr. A. P. Richardson, who jointly devised and managed the plan.

Amber.

Amber is found on the southern shore of the Baltic, where it is cast up by the action of the groundswell after the northerly gales. It is also found on the coast of Sicily, on the Adriatic, on the English cost Norfolk and Suffolk, and at Cape Sable, Maryland. Mining for amber in beds of brown lignite is carried on in Prussia, and it is found in excavations all over Europe. Still amber continues to be the "gem of the sea," by which it is yielded only after a storm, and in such small quantities that its value has ever remained undiminished.

Amber is found in masses, irregularly shaped, and usually of small size. The color is of all shades, from a pale straw to deep orange. It is brittle but can be easily cut with a sharp knife, it is the opinion, and is only an opinion that it is simply an exhuded vegetable juice. Baron Leibig thinks it probable "that amber is a product of the decay of wax, or of some other substance allied to the fixed oils." Sir David Brewster says that amber is an indurated vegetable juice. Wood, leaves, flowers, and fruit have been found inclosed in amber, and recognized as having belonged to coniferous trees now extinct.

Sicilian amber is usually of a deeper color than that from the Baltic, and it is said that in Germany an experienced amber worker can determine the locality of amber from difierences in its appearance. Neither is it invariably found in a hard state. An instance is on record of a gentleman having received from a friend living on the Baltic coast a piece so soft as to take an impression of his seal; and another piece is described as soft on one side and hard on the other

The uses of amber are not very numerous. As a material for art carving nothing can be more beautiful. The principal market is Constantinople where it is made into pipe mouthpieces, and articles of female adornment in the shape of beads. The Turks and Armenians are said to be fine judges of amber, and the bazaar at Stamboul, where the amber workers are located, is full of interest to the connoisseur.

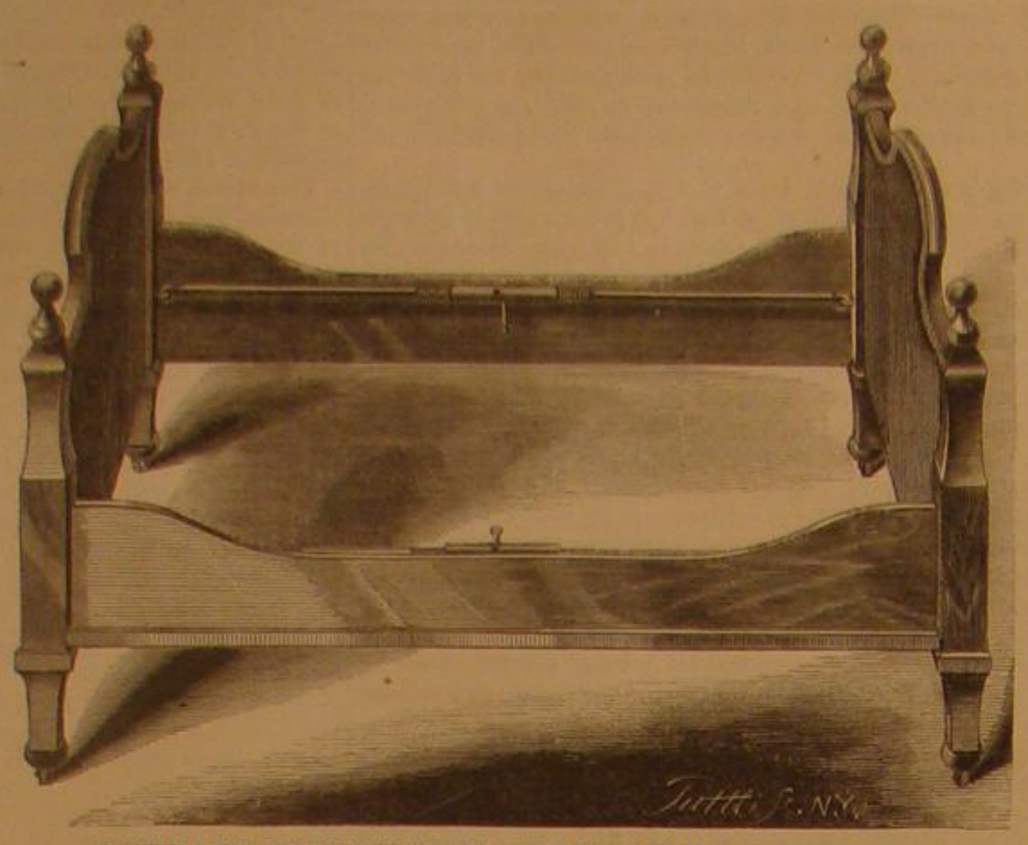
The only purpose to which it is applied in the useful arts is in the manufacture of varnishes for carriage builders and photographers. That used for carriages is expensive, and is a long time in drying, but it is the hardest and most invulnerable of any known varnish.—*Providence Journal.*

Crystallized by Concussion.

A circumstance apparently confirmatory of the disputed theory of a molecular change in iron from mechanical shocks, is related by a correspondent at Underhill, Vt. He says that an old relic of the Revolution, a French gun barrel, which had been refitted with new stocks and locks several times, after standing fire perhaps the millionth time, burst, and in such a manner that every one who saw it pronounced it to have been originally a cast iron barrel, until an old iron maker convinced them by showing the weld on the under side. But the appearance otherwise was exactly like cast iron, and brittle at that. Mr. E. attributed the change in the iron to the action of the sulphur in the powder and its long use and many times repeated action.

Improved Bedstead Fastener.

Bedsteads which are secured by means of screws offer great facilities for the hiding of the vermin which find their favorite retreats in the apertures thus left for their convenience. Various other methods of fastening have been devised, but where recesses are made in the posts or bars the bedbug is sure to ensconce himself, even if the crack through which he passes will scarcely admit a thin knife blade. The one shown in the engraving has all its parts exposed and does not require any mortising or boring of the wood. It is simply a double bar or rod on each side of the bedstead, inside the side pieces, the outer ends of which are formed into hooks which engage with staples in the posts, and the other ends of which are connected by a screw sheath. The end of one of these half bars is threaded with a right-hand screw and the other with a left-hand screw. The coupling has a lever, knobbed on each end, that passes through its center, by which the two rods are screwed up and the frame of the bedstead tightened. These rods also form a support for the ends of the slats, making a spring-bed bottom.



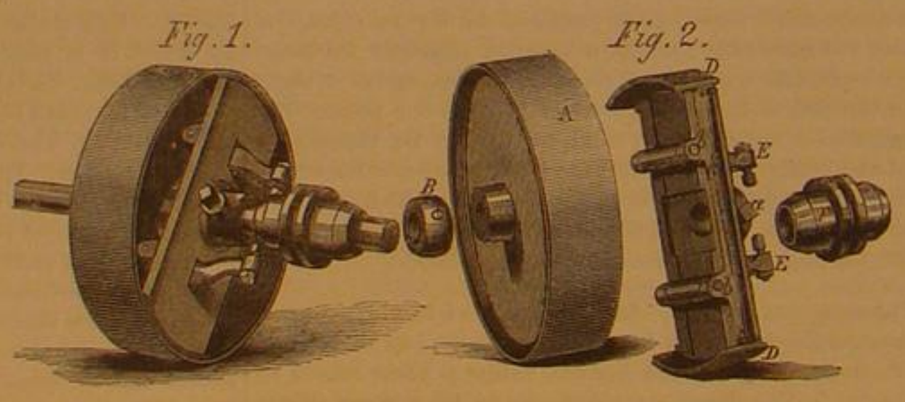
COCHRAN'S IMPROVEMENT IN FASTENING BEDSTEADS.

The device is so simple that no further explanation is necessary to convey a proper idea of its construction and operation. It was patented through the Scientific American Patent Agency, April 23, 1867. For further information address the patentee, George G. Cochran, 95 Powers street, Brooklyn, N. Y.

Improved Friction Clutch Pulley.

In almost every workshop much trouble and annoyance is occasioned by the derangement and noise of friction and clutch pulleys. While these difficulties may often be caused by defective workmanship, it is more frequentiy the case that the pulleys are of imperfect construction and therefore unfitted for long continued or constant use. A friction clutch pulley is shown in the engraving which it is believed will be found, both in principle and in execution, free from the almost universal objections existing in pulleys of this class.

Fig. 1 represents a complete friction clutch pulley in working position upon a shaft. Fig. 2 represents the parts of the same. A is a pulley, the inside surface of the rim of which is turned. This pulley revolves freely upon the shaft and is kept in position on one side by the collar, B, and on the other by the segment plate, C. The segment plate, C, is fastened to the shaft by the set screw, *a*. Attached to this plate and sliding in planed grooves are two segments, D D, which move in opposite directions at right angles to the shaft. The outer surfaces of these segments are turned to the same diameter as the inside of the rim of the pulley, A. The two levers, E E, are connected to the segment plate, C, by pins passing through them and the ears, *b b*, which act as fulcrums. These levers pass through and are fitted to the segments, D D, and also through the segment plate, C. In the outer ends of these levers are adjusting screws with set nuts. Fitted to and sliding upon the shaft is a thimble, F, the end of which is turned a conical shape. Upon the outside of this thimble is a groove into which a shipping fork is fitted. It will be readily seen that when the thimble is pressed forward toward the pulley the conical end comes in contact with the rounded heads of the adjusting screws by which the two levers, E E, are forced outward carrying the two segments, D D,which movement brings the faces of these segments into contact with the inside of the rim of the pulley, binding the surfaces together, and thus communicating the motion of the pulley to the shaft. This pulley is perfectly noiseless as well as simple and efficient, with no lisbility of locking or unlocking except at the will of the operator. Those interested can address the manufacturers, J. R. Brown & Sharpe, at Providence, R. I.



BROWN & SHARPE'S FRICTION CLUTCH PULLEY.

MAINE AND HER PUBLIC WORKS.

The remarkable vigor and unity displayed by the people of Maine in developing the great natural resources of their territory, point to a future of eminent—who knows but pre-eminent?—prosperity. We have occasion almost weekly to note fresh instances of manufacturing enterprise called into existence, and sometimes coming when called, all along the magnificent descents of her many streams, by the liberal votes of township after township. The state and township activity in railroads is equally noteworthy. All towns are allowed by law to take stock in railroads to the amount of five per cent of their valuation, beside special authorizations for larger subscriptions. This permits the whole property of the State to be taxed by town votes at least five per cent for the grand purposes of internal improvement. A very healthy and important characteristic of railroads built on this plan, is that so far they become public property—belong to those who give them right of way and are to use and support them—and are in the natural way to become what roads of all kinds ought to be, free highways.

The same privilege is granted to towns in the adjoining State of New Hampshire, and will doubtless operate powerfully there also upon the progress and ultimate destiny of the system of roads passing through both states in common. In Maine, however, these as well as local lines find their conception, and inception, and main impetus, and receive liberal exemptions from taxation, and direct subsidies, at the hands of the State.

In 1860, says the *Railroad Journal*, the total length of railroad within the state was 472 miles, costing $16,576,385. In 1866—less than two years later, leaving out the war—the miles were 509, beside the Portland and Montreal line from the state boundary to Island Pond, 71 miles, built entirely by Maine capital, and the total cost (correcting the *Journal's* misprints) was $22,104,845. This resumption of progress is but a small instalment of a system of public works which challenge general interest by the courage and liberality they display. We mention the principal features.

The European and North American Railway, from Bangor to St. John, New Brunswick, is a line of 194 miles, 84 in New Brunswick and 110 in Maine. The Government o New Brunswick gives $10,000 per mile within its domain as the work proceeds. To the Maine line, the State proposes to contribute from the funds expected from the United States in payment of claims, and has also appropriated a valuable tract of public lands. The city of Bangor has voted to loan its credit for $1,000,000, beside $500,000 to the Piscataquis branch reaching the slate quarries at Brownsville. Work on the main line is in active progress, and a large proportion of the expensive work on the two terminal sections has been accomplished. Track laying was to be commenced about the first of this month, and 55 miles, or half the road in Maine, is to be opened within the present year.

Portland votes $700,000 to the Portland and Ogdensburg, passing through New Hampshire to the Vermont system of roads and completing the line to Lake Ontario. St. Johnsbury, Vt., aids to the amount of $200,000, and Messrs. Fairbanks subscribe $150,000. The Maine Central Extension, from Danville Junction to Portland, is regarded as certain to be built within a few years at farthest.

The line from Bangor to Winterport is under survey.—That from Newport to Dexter is provided with capital and already leased to the Maine Central.—From Belfast to Newport the towns are authorized to subscribe 20 per cent of their valuation to the stock of the Belfast and Moosehead Lake Company, and a number of them have already voted their quotas.—The Somerset road, from Waterville to Solon, is to be built by the towns on its route, several of which have already filled their quotas.—The city of Bath subscribes $123,000 to the stock of the Knox and Lincoln road, and lends $100,000 on condition that the road shall terminate at Bath. In all, according to the railroad contemporary from which we have derived in substance most of the above facts, the length of new road in progress or contemplation amounts to 458 miles, and will nearly double the present system within the state.

Menhaden Oil Manufacture.

A correspondent in Braintree, Mass., who is well informed on this subject, gives us the following particulars. It will be seen that this branch of business is quite extensive and important: Menhaden oil is extensively manufactured at stations the whole length of the sea coast of New England, beginning at Connecticut and extending as far north as Frenchmans Bay, in Maine.

Beside those in Narragansett Bay there are works at Cape Cod and Cape Ann. In one district Waldoboro, in Maine there are ten establishments with an average capital of five thousand dollars, employing some one hundred men. On Penobscot Bay there are several extensive works owned by Boston capital. There are also some twenty vessels fitted out for the business from the state of Maine, having their furnaces and presses and doing all the work on shipboard.

There is scarcely a town on the sea coast below the mouth of the Kenebec, where menhaden oil in some measure is not manufactured. Near Bristol, R. I., are the extensive works of the Naragansett, Atlantic and Neptune company with a capital of $40,000 and a number of others of lesser note."

MAY'S PATENT KEY GUARD.

A favorite operation of the burglar is facilitated by the carelessness of householders in leaving the key in the lock on the inside, when it may be readily turned by seizing the point with key nippers and turning it in the lock. Yet if the key is taken out there is no obstacle to the use of a skeleton. To overcome these objections and furnish a retreat from this dilemma is the object of the device under consideration. It was patented March 12 1867, through the Scientific American Patent Agency, by Franklin J. May assignor to himself and J. G. Barnum. The key plate, A, may be pivoted either to the lock



or the door. It resembles an ordinary key plate, except that it has a slot cut from one side on a radius struck from the center of its pivot. To one side of the key-plate, beneath the slot, is pivoted a weighted pawl, B, the weight of which keeps it always in an upright position, except when swung to one side by the hand. When in position and the key is in the lock the upper point of the pawl comes against the shank of the key, which at the point where the key-plate slot engages with it, is flattened. It will be seen that as the slot is not wide enough to allow the cylindrical part of the key shank to turn, but fits only the flattened portion, so long as the key plate covers the hole the key cannot be turned. But by inserting a wire or other properly shaped implement from the outside the burglar might swing the key plate to one side. To prevent this is the office of the pawl, B. This, by means of a stop, C, can be swung only in one direction—the weighted bottom away from the key-plate—so that it securely prevents the movement of the plate while the key is in the lock.

It can be attached to locks of all sizes and shapes; it is made of various styles to suit all descriptions of lock, being japanned, bronzed, polished, or plated; the cost is trifling,and its durability equal to the life of the lock. The patent right is for sale. All communications should be addressed to May and Barnum, 74 Bleecker street, New York City.

Hints.

Mr. Rowland Hill, of Richmond, Va., gives this handy rule for ascertaining the area of a circle, when the diameter and circumference both are known and the decimals not remembered: "Multiply the circumference by the diameter and divide the product by 4. The quotient will be the area." We have tested this rule and find it correct. It is worth remembering.

He says again: "When the hinges of a door are not in a vertical line the door exhibits a perversity in remaining either closed or open, which to a good housewife is vexatious. I have often wondered that this obedience to the law of gravitation was not made use of by some of the inventors of self-opening carriage gates."

We think it has been applied to this object, but cannot at present refer to the particular case. Common gates and doors which open either way are hung on hinges not in a vertical line.

STEAM BOILERS---THEIR FORM, CONSTRUCTION, AND MATERIAL.

NUMBER SIX.

Although the attention of engineers, mechanics and others has been directed towards endeavors to acertain the cause, or causes of boiler explosions ever since the introduction of steam as a motive power, it does not yet appear that their efforts have been crowned with very marked success. This result, or want of result, is no reflection upon the ability of those engaged in prosecuting these inquiries; for the circumstances attending explosions are so varied, and even contradictory, that the attempt to single out any one as an adequate cause for all cases must be futile, and it would almost seem that every case must be treated separately. Absence of water, overheating of plates, uneven firing and feeding, corrosion and wear from long use, weakness of form, and imperfection of workmanship and material are each offset by conditions of exactly the opposite character, and under every one of these conditions boilers have exploded, if human testimony can be relied upon.

Under such discouraging circumstances the task of detecting the causes of explosions and suggesting the means of prevention is an exceedingly difficult one. When boilers explode while under the charge of skillful and competent men, it would seem that the causes must be limited, or nearly so, to weakness of form, imperfection of material, or poor workmanship. The first of these has been treated in previous articles. It is manifestly necessary, even if one form should be determined upon as the strongest, that it should be modified to suit varying localities and uses. That which would answer admirably for stationary purposes might be wholly unfit for vessels, and boilers adapted for river boats might be unsuitable for sea going ships. None of these forms would do for the locomotive. We are aware that the Harrison boiler is claimed to be adapted to all situations except the last, and similar claims have been made for others; but these claims have not as yet been generally acknowledged, and we do not propose to discuss them. The broad statement may be honestly made that a form of boiler specially adapted for steam driven vessels is not a form well fitted for stationary uses nor for the railroad. As, therefore, no one shape can be adopted for all purposes, the only remedy for weakness of form is judicious staying.

Imperfection of material must be acknowledged as a prolific source of explosions. The practice of testing the finished boiler by hydrostatic pressure is an exceedingly expensive and, in our opinion, not a satisfactory one. If the boiler fails under the test, either it must be taken to pieces and the whole material condemned, or, as is generally done, the defective plate must be removed and another substituted. If the first course is pursued, injustice is done to the boiler maker and the iron manufacturer; for it might be that the larger part of the material used was what it should be, and if the latter course be taken the purchaser may be the loser; as a boiler which has been so strained as to show its weakness suffers some deterioration, and may have been tested closely to the rupture, while the new plate which replaces the old one may be in an entirely different condition. The test should be made on the iron before it is put into the form of a boiler, and then the test on the boiler itself would be made simply to detect faults of construction. It is not seldom the case that the iron which composes a boiler shows no defect under the severest hydraulic test, but when heated and exposed to the pressure of steam, blisters and cracks exhibit themselves to the gaze of the surprised engineer. Such a preliminary test is proposed by the plan of Richard Montgomery of this city, who corrugates the plates of which a boiler is composed by running them between rollers having circumferential depressions, the cross sections of which exhibit alternately a concave and a convex form. The plates are evenly heated to a bright, cherry red, and then passed between the corrugating rollers, coming out either straight, or, if desired, curved to correspond with the diameter of the boiler. By this method it is claimed the quality of the iron is tested, inch by inch, as it passes through the rolls, so that if any flaw or imperfection exists it will be revealed by the trial. Only the toughest and most homogeneous iron can stand such a test, although the question might be raised whether the iron might not suffer some deterioration from it. The corrugations are about two inches from point to point, giving immense rigidity to the iron and increased heating surface. This plan of testing boiler iron appears to be well adapted to the detection of poor material. It is certain that corrugating iron adds greatly to its rigidity and power of resisting pressure.

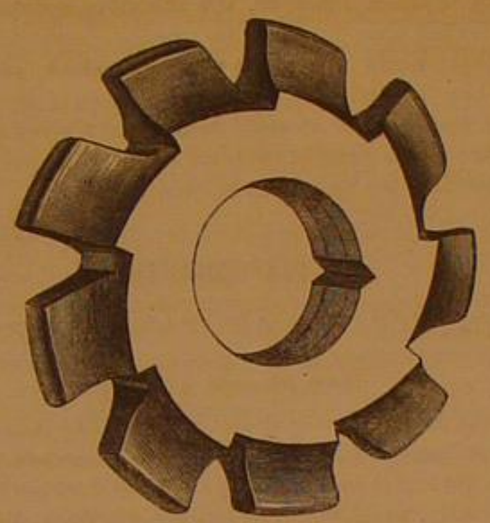
We recommended in No. 5, current Vol., page 69, such a device for strengthening boiler flues, copied from the London *Engineering*, an illustration of which we furnished, giving our reasons for our favorable opinion. If in this case it was—as had been proved—an advantage, why should it not be when extended to the construction of the entire boiler?

Poor workmanship may be called another one of the causes of boiler explosions. Calking with the sharp edged "set" or chisel is often improperly done and the sheet is indented and partially cut through by its injudicious management. The percussion of the hammer transmitted through the chisel will more or less change the texture of the iron and assist any tendency to weakness. The introduction of stays is not always properly managed. Sometimes they are put in as closely as may be, where there is no real need of their services. Every one furnishes a nucleus for the accumulation of scale and it is in these spots where corrosion most readily takes place. In punching the holes for rivets, carelessness or ignorance allows such aberrations that in some cases half the diameter of one hole may overlap the other. Then the "drift" or the reamer is introduced and a rivet put through, the shank of which does not half fill the irregular or enlarged aperture, and the whole dependence of the workman is on the head and riveted end. Manholes cut out of a plate without strengthening rings around them are simply invitations to a rupture. Patching old sheets with new plates and drawing them to place by screw bolts is another fault which must sooner or later show deleterious results.

But there is one cause of boiler explosions to which we have not adverted. That is the custom of purchasing old or discarded boilers to do new work. If a man purchases an engine without a boiler he casts about to find a boiler large enough, and, above all, cheap enough for his purpose. In both respects he can be easily suited. Knowing, perhaps, nothing himself about a boiler, he ventures upon the precarious ground of receiving the statement of the would-be seller because by so doing he may save a few dollars. He buys a boiler perhaps honeycombed internally by corrosion but fair outside, and sets innocent men to work about it. An explosion occurs and the jury of inquest over the victims of this man's credulity or criminal ignorance brings in a verdict of death from accidental explosion. The sale of boilers ought to be regulated by law as well as their manufacture. If they are of good material, good form, good workmanship, and in good condition the purchaser ought to know it and if not the seller or manufacturer ought to suffer for it.

BROWN & SHARPE'S CUTTER FOR THE TEETH OF GEARS.

While improvements have been made in almost every other tool in common use, there seems to have been no change for the better in the construction of cutters for the teeth of gear wheels, which as every machinist knows, are troublesome and expensive to make, and last but a short time, as they soon become dull and then require to be annealed, re-cut and hardened again, the cost of which is nearly equal to that of making new cutters, while the steel is liable to injury from repeated heating.



To overcome these difficulties a cutter has been made as shown in the engraving, by constructing the teeth or blades in the form of segments or curvilinear sections that are mechanically accurate in outline and of equal size and contour throughout their entire length, each of which has a sufficient circumferential inclination with respect to the revolving circumference of the cutter to produce the proper degree of clearance, so that the tooth may be sharpened by grinding away its face until its strength is permanently impaired, and so that it will always present the same cutting contour, each new face and cutting edge produced by grinding being a fresh radial section of an equi-form tooth throughout its whole length.

A cutter made on this plan will outlast many of the old form with the advantage of being always ready for use. If, as frequently happens, the cutter becomes dull before a wheel is completed, it can be taken out, sharpened and returned to its place in a few moments without any risk of altering the form of the teeth to be cut. From want of knowledge of the true principles of gearing or from want of practice in their application many machinists would prefer to purchase cutters rather than to be troubled with making them, especially if they could promptly procure a superior tool at a reasonable price. Those interested can obtain further information by addressing the manufacturers, J. R. Brown & Sharpe, at Providence, R. I.

EXPOSITION NOTES.

A MODEL is exhibited in the French department, of a mine elevator, or a sort of a car pump. A continuous frame reaches to the bottom of the shaft, furnished with catches for the cars at regular intervals. The whole frame rises and falls like the piston of a pump; at each rise bringing up each car caught upon its hooks, the distance of the stroke, and lodging it upon stationary catches, from which it is again taken and elevated a further stage by the next stroke, and so on to the top. The arrangement involves a heavy and extraordinary addition to the weight to be raised.

A WHOLE WELDED BOILER from Dusseldorf is exhibited in the Prussian annex. A steam dome is welded upon the boiler, and so accurately and smoothly is the whole work done as to be hardly distinguishable, superficially, from a casting.

THE ANNULAR BAKING FURNACE invented by Hoffman, of Berlin, is on exhibition. The annular space is divided into compartments, so arranged that the hot draft from the baking of one set of bricks or earthen ware passes into the next compartment to dry another charge, and thus travels the circuit until exhausted of its heat. While the next charge is being burnt, the draft of air therefor is passed through the last-burned pile, cooling the latter and carrying its heat into the adjoining fire. The coal is introduced in fine dust through small orifices in the upper part of the oven, and consumed before it reaches the oven floor.

A MILLSTONE, from Paris, embodies a bolting sieve; radial pieces of wire gauze being let into the nether stone at intervals, through which the flour passes, while the bran is carried to the outer edge.

A UNIVERSAL EVAPORATOR, from Paris, consists of a series of hollow copper disks on a hollow shaft, through which steam, at a high heat, is passed continuously through the whole interior. These disks, all dipping in a trough of the liquid to be evaporated, and revolving, carry a constant film of the liquid upon their hot exterior, which of course passes rapidly into vapor. The plan is not novel. We notice that Mr. H. F. Schroder, of Cincinnati has just re-invented one for the benefit of our sorghum farmers.

EVELYN'S STERN PADDLE (England) consists of a horizontal oar blade, placed transversely to the stern of the ship, and moved up and down in the water; feathering of course to an opposite pitch at each change of direction.

A TWELVE-CHAMBER PISTOL (Paris) has its chambers in the periphery of a vertical wheel, which is so easily removed and and replaced, that an indefinite supply of ready-charged wheels may be carried and used in succession. An old idea but a good one if successfully applied.

A NEW NAIL-CUTTING MACHINE is exhibited by the Wickersham Nail Company, of Boston. In the usual machinery, the plate is turned over alternately to right and left, with manual dexterity, by the feeder, in order to compensate at each cut for the unequal depth taken between the head and point of the nail. To enable the plate to feed directly forward, is a desideratum upon which much inventive pains have been expended by different parties. This machine acts with ten cutters inclined alternately so as to cut alternate nails, "heads to points," and cuts eight nails at a stroke, and nearly 1000 per minute, feeding almost automatically.

TAKEN IN.—The English begin to suspect that they are tricked in the exhibition of war material at Paris. They find that while they have freely showed their hand, placing the best results of their ingenuity and lavish expenditure at the service of all who choose to take drawings and specifications of their ships, guns, and projectiles, other nations, particularly France, have been careful to expose nothing that is of the slightest novelty or consequence. They feel as if their rivals had got the substantial advantage, by leaving them the empty triumph of "walking over the course."

WORKINGMEN'S EXCURSIONS are organized by a Workingmen's Exhibition Committee, in London, which has obtained from the Imperial Commission the use of a large building, comfortably fitted up for the accommodation of the visitors (to be not less than 200 per week), and has made such arrangements for transport, etc., that the entire expense of seeing the exposition for a week (meals excepted) would be only about $7,25.

SUCTION OF WELLS, is a principle patented and illustrated by M. A. Donnet, civil engineer, of Lyons. By closing the well air-tight, and exhausting the air, the water currents reached by the well will be drawn upon, together with their branches and remotest connections, with considerable force, and the flow of water, where insufficient, will be materially increased.

A GREAT H-GIRDER is exhibited from the Chatillon forge, measuring 3 feet 8 inches deep, 1½ inches thick in the web, and 12 inches wide in the flanges. The same establishment sends another gigantic beam 110 feet long, 8¾ inches deep and 4½ inches across the flanges, and exhibits a short strip of 3-in. L-iron, only 140 feet long.

New Recipes.

WHITEWASH AND STARCH.—The *Chemical News* promises that a strong solution of sulphate of magnesia will give a beautiful quality to whitewash, and a little of it used with starch will add considerably to its stiffness and render cotton or linen garments to a certain degree incombustible.

BLEACHING GLUE.—Soak in moderately strong acetic acid for two days, drain, place on a sieve, and wash well with cold water. Dry on a warm plate. This method is given in *Dingler's Journal*.

CEMENT.—A cement particularly adapted for attaching the brass work to petroleum lamps, is made by Puscher, by boiling three parts resin with one of caustic soda and five of water. The composition is then mixed with half its weight of plaster of Paris, and sets firmly in half to three quarters of an hour. It is said to be of great adhesive power, not permeable to petroleum, a low conductor of heat, and but superficially attacked by hot water. Zinc white, white lead or precipitated chalk may be substituted for plaster, but hardens more slowly.

WELDING COMPOSITION.—For iron or steel or both together, calcine and pulverize together 100 parts iron or steel filings, 10 sal ammoniac, 6 borax, 5 balsam copaiva or copaiba. One of the pieces is to be heated red, carefully cleaned of scale, the composition is to be spread upon it, and the other piece applied at a white heat and welded with the hammer.

DRILLING GLASS.—To the old mode of boring glass with a file wet with oil of turpentine, a correspondent of the *Chemical News* adds an amendment from a German source, confirmed by his experience, to the effect that dilute sulphuric acid is much more effective, with less wear of the tool, than oil of turpentine. It is stated that at Berlin, glass castings for pump barrels etc., are drilled, planed and bored like iron ones, and in the same lathes and machines, by the aid of sulphuric acid.

BUSINESS AND MANUFACTURING ITEMS.

SILK.—A large Boston silk-weaving concern is reported to be about to remove its machinery to Paterson, N. J.——One of the largest silk mills in Paterson, says the *Press*, has lately been taking a hundred or more hands, besides introducing additional machinery sufficient to set up a large mill, running on full time, and turning out large quantities of silk. *Per contra*, many of the other mills are nearly stopped.

LEATHER.—A tanner in New York is experimenting in tanning cat-fish skins, which it is thought will make good leather. The cat fish of the Western waters, it is said, sometimes weigh from one to two hundred pounds.——It is time that our rat skins were beginning to be utilized. At the present enormous price of gloves, our inventors and manufacturers ought to be equal to doing something with our undeniable plethora of raw material in the shape of rats. Rat catching for the glove makers is a great business in Paris and other European cities. Our rats want reconstructing, badly.

IRON.—The Newburyport Arms Company has commenced turning out rifles and pistols.——A new machinists' tool manufactory has been started at Providence.——The Badger Iron Works, New York City, have just completed two carriages for 20-inch guns, weighing 12 tuns each, for the Chilian Government. The guns are to be cast at Pittsburg.——After a suspension of three months, the rolling mills in Youngstown have resumed operations at the old wages.——The iron sand of New Zealand is to be smelted on a patented plan by a company formed for the purpose, and operations will be commenced without further delay.——The Cornwell Iron Works, near Cedar Bluff, Ala., have resumed the production of their superior quality of iron, which will be shipped to New York in pig.——A new railroad rolling stock manufacturing company has been incorporated in Dayton, Ohio.

COTTON, ETC.—The Renfrew (South Adams) Manufacturing Company are putting up a mill, 150 feet long by 66 wide, with two wings, each 40 feet by 56, and will run 260 looms.——The cotton mills of Columbus, Ga., burned during the war, are mostly rebuilding and will resume operations in the course of the present year.——The Falls City Manufacturing Company, Louiiville, Ky., propose to increase their capital by $50,000 and eventually to $1,000,000, and to take another large factory for their linen works, and to manufacture flax machinery for their mills.

RAILROADS, ETC.—The gross earnings of the Erie Railway for 1866 were over fourteen and a half millions ($14,596,413 09) against nearly sixteen and a half millions ($16,462,227 90) in 1865. Net earnings, $3,743,273 05; net decrease from 1865 $964,559 52. The falling off is attributed to the stoppage of the Government war business and the general stagnation following the war. The company operate 784 miles of road, have 371 locomotives and 6,000 cars, a capital stock of $25,111,210, a funded debt of $22,429,920, and property amounting at cost to $54,287,874 49. A dividend has been declared of 4 per cent on common and 7 per cent on preferred stock.——The Hudson River Railroad Company have recently created new stock equal to the whole amount of the old ($7,000,000) making their capital now $14,000,000 in addition to $5,550,000 funded debt. Fifty per cent on each share of new stock is allowed to the old stockholders as accumulated profits (including April dividend) and the other half, raised in cash, is to be applied to the improvement of the station property in St. John's Park and of the whole line from New York to Albany.——The Oregon Central Railroad is intended to connect the steamship landing on the Columbia River with the head of the Willamette Valley, 150 miles. It has a land grant of 12,800 acres per mile and a State subsidy of $10,000 per mile in gold-bearing bonds, for the first 100 miles. The work is to be commenced at once and finished in three years.——The new Suspension Bridge at Niagara is to be located on the American side near the gas works; on the Canada side a short distance below the Clifton House. The stockholders organized on the 2d ult. The preparation of materials has been commenced, and the bridge is to be erected in the course of the summer.——The first 305 miles of the Union Pacific Railroad were graded, bridged and ironed with a heavy T-rail and supplied with depots, repair shops, stations, locomotives, cars and all the necessary appurtenances of a first-class road for $50,000 per mile.——The St. Paul and Chicago Railroad (capital, $6,000,000, to be completed in two years) is to connect St. Paul with the Chicago and Milwaukee roads at Winona, 101 miles, and run thence 50 miles to the Iowa State line. It has a land grant of 904,960 acres, nearly an air line from Chicago to St. Paul, and very light grades. Beyond St. Paul, the St. Paul and Pacific line runs nearly straight to the Hudson's Bay Company's territory, and is already in operation 76 miles.——The Persian telegraph is to be completed from Teheran to the Turkish frontier, by the end of June.——After ten years' warfare, the Great Western and Grand Trunk Railways of Canada have come to an agreement on rates and fares.

WOOLEN.—There are five hundred woolen factories in the State of Indiana, some of them having over three hundred thousand dollars invested.——The stockholders of the Amesbury (Mass) Woolen Mill Company have decided to sell at auction the entire corporate property which cost about $140,000. The company is heavily in debt.

MISCELLANEOUS.—The Chicago *Journal* says that one of the leading architects estimates at least three million dollars' worth of contemplated new buildings entirely abandoned or indefinitely postponed on account of the eight-hour movement.——The tobacco manufacture of New York City and the suburbs is an enormous business, said to exceed that done in any other staple, and to be second only to cotton as an export, selling $100,000,000 annually, employing 25,000 persons, and conducted by 1,613 firms.——A new paper mill is to be built at Elmira this summer, and a new tannery.——High street, Columbus, is to be paved with the Nicolson pavement, at a cost of $80,000.——The Western farmers are sowing flaxseed very extensively the present season.——The Board of Engineer Officers detailed under the Act of Congress to form a plan of improvement of the Hudson below Albany, have decided to proceed with the plan formerly adopted and partially carried out.——The city of Chicago is deepening the Michigan and Illinois Canal by an excavation through solid limestone ten feet deep and eight miles long, so that boats can float out of Chicago River into the canal without a lock, and a current will be formed in the Chicago River to the great improvement of that stream. The work will be completed in about two years. The Washington street tunnel is also going forward.——Free water power and freedom from taxation for five years, has been voted to new manufacturers on the Molunkus River, near Sherman Mills, Aroostook county, Me.——Dam and mills are going forward in Andover, Me., on Black Brook; also a starch factory on Gardiner's Brook.——The various Holyoke (Mass.) Mills unite in mitigating dull times for their employees by economy in board; the prices established in the corporations being $3 50 for males, and 2 50 for females.——On the dissolution of the large furniture manufacturing firm of Mitchell & Rummelsburg, Cincinnati, by the death of Mr. R., the surviving partner recently threw the establishment into a co-operative stock concern, with a capital of $2,000,000 in $100 shares, a considerable part of which was taken by the workmen.—The salt manufacture has been resumed at the old mills near Emporium, N. Y., with the advantage of the Buffalo and Washington Railroad.——Harmony Mills, Cohoes, N. Y., have in one building two unobstructed rooms measuring 70 by 625 feet and 612,500 cubic feet, and five in another building, 72 by 560.——A paper mill is going up in Butler county, Ohio; cost $100,000.——Little Rhode Island employs $33,000,000 of manufacturing capital and produces $103,000,000 worth of goods in a year. Considering the state as one complex Yankee machine, the attentive spectator will perceive issuing from its different mouths every second in working hours nearly ten yards of cotton cloth, nine yards of calico, one yard of woolen cloth, one dozen of shoe and corset lacings, one yard of worsted braid, and a spool of thread; a horseshoe and a gross of screws every four seconds, beside other matters too numerous to mention.

Correspondence.

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

The Recoil of Guns.

MESSRS. EDITORS:—In the article on "The New Steam Gun Carriage," page 350, the following part appears not entirely correct, viz:—"A ball moving at 1,000 feet per second of initial velocity, weighing 450 pounds, exerts a force equal to 450,000 foot-pounds. If the gun and carriage weigh 50,000 pounds, they will have an initial velocity of 9 feet per second and a force of 450,000 pounds, which must be absorbed before they are completely brought to rest."

The energy of the ball is correctly calculated at page 302,

$$=\frac{450}{2\times 32{\cdot}15}\times 1{,}000^2=6{,}998{,}444 \text{ foot-pounds.}$$

Energy of gun and caarriage

$$=\frac{50{,}000}{2\times 32{\cdot}15}\times 9^2= \quad 62{,}967 \text{ foot-pounds.}$$

Total energy exerted by powder=7,061,411 foot-pounds.

Assuming the charge at 40 pounds, the effect above overcoming resistance of atmosphere is 170,000 foot-pounds per pound of powder, which agrees with table page 302.

Taking the distance traveled through by the ball till leaving the muzzle at 12 feet, the total average pressure is 7,091,411÷12=590,951 lbs. on an area of 176 square inches, or 3,357 lbs. per square inch above atmospheric pressure.

Owing to the high degree of expansion, the initial pressure in the gun must be perhaps ten times as large or more, say 35,000 pounds per square inch. The area of the 11-inch cylinder taking up the recoil is 95 square inches. If the piston moves one foot before stopping, the average pressure will be 62,697÷95=662 pounds per square inch: at four feet motion, 165 pounds. Further calculations without more complete data, and disregarding friction, are of no value.

The difference between the energy transmitted to the ball and that imparted to the gun and carriage is by no means in in opposition to the laws of Newton, as some of your correspodents appear to think.

The expression, "a force equal to 450,000 foot-pounds," is objectionable. It appears to be settled among engineers that whatever is expressed in foot-pounds is called "work" or "energy," while a "force" is given in pounds or other unit of weight.

A. FABER DU FAUR.

Washington, May, 1867,
Third Div. Q. M. General's Office.

Electricity in Iron Smelting.

Of all the remarkable applications of electro-magnetism which have been made within the past three or four years says the *Athenæum*, the most remarkable is perhaps the one now talked about, namely, the use of an electro-magnetic current in the smelting of iron. We hear that the experiment has been tried at one of the leading ironworks in Sheffield, and with complete success. The mode of operation as roughly described, is to place a fixed electro-magnet opposite an opening in the side of a furnace, to excite the magnet by means of a Smee's battery, and to direct the current of magnetism into the molten metal. The effect is surprising; the metal appears to bubble and boil, the melting is expedited, which economises fuel, and the quality of the iron is so much improved that for toughness and hardness it can hardly be equalled. It appears that some, if not all the impurities which remain after the ordinary process are driven out by the use of magnetism; consequently, this new application of the occult element may be regarded as full of promise, for all who work in iron. All of which is to be taken with a grain of salt.

Vitrified Photography.

De Mothay and Maréchal have produced a new method for fixing vitrified photographic images in porcelain enamel, glass, etc. The article is first varnished with a solution of 4 parts of caoutchouc in 100 of benzol, with the addition of one part normal collodion. After drying, a second coating of iodized collodion is poured over the first, and unites intimately with it. It is then immersed in a bath of nitrate of silver, and the image is produced either by camera or superposition, developed by any of the usual agents, and fixed by two successive baths, one containing a solution of an iodocyanide, and the other an alkaline cyanide. It is next steeped for some instants in a solution of protoxide of iron, pyrogallic acid, or any other substance that will reduce the salts of silver. The image is intensified by the action of pyrogallic, gallic or formic acid, or sulphate of protoxide of iron mixed with an acid solution of nitrate of silver: requiring four to six applications for images to be seen by reflection, and twelve to fifteen for those to be seen by transparency. During this operation the image is washed three or four times in alternate baths containing iodocyanides and alkaline cyanides, and then, immediately afterward, in sulphate of protoxide of iron, pyrogallic acid, or other reducer of salts of silver. The consecutive baths are to dissolve the non-adherent silver precipitated over the whole plate in each reinforcing bath, while intensifying the fixed image. The washings in the reducing bath, rendering the metallic surface neutral, increase powerfully the subsequent action of the re-inforcing bath. The image is now immersed for several hours in a bath of chloride or nitrate of platinum, or in alternate baths of chloride of gold and nitrate of platinum, or again in a bath of chloride of gold, according to the color desired. During this steeping, the silver of the image is partly replaced by platinum or gold or a mixture of both. The platinum bath gives eventually by vitrification a greenish black, the alternation of platinum and gold yields black, and the gold alone results in gilt images. Next the image is washed in a solution of alkaline cyanide, or a concentrated solution of ammonia; then covered with a thick varnish of caoutchouc or gutta percha, and heated in a muffle, when the organic matters are consumed and the metal left. Finally, the image is covered with a silicic or boracic glaze, and brought to an orange red heat by which it is vitrified, and unchangeably fixed.

Illustrated Patent Office Report for 1865.

We are indebted to Messrs. E. R. Jewett & Co., publishers, Buffalo, N. Y., for a bound volume, Part II., Illustrated Mechanical Report for the last part of the year 1865.

The engravings are well executed, the inventions clearly defined and the entire work a marvel of neatness. These Reports which Messrs. Jewett & Co. have published for a number of years are in great contrast in point of execution to most of the public documents issued under the direction of Congress.

We hope the Commissioner of Patents will exert all of his influence to award the continuance of the publication to Messrs. Jewett & Co., who have done the work so acceptably.

Recent American and Foreign Patents.

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

BOQUET STAND AND HANDKERCHIEF HOLDER.—A. D. Frye, New York City.—This invention relates to a new and ingenious arrangement whereby the beauty and value of a boquet of natural flowers is greatly increased by its combination with the beautiful designs of art. The boquet is formed on a highly ornamental tubular holder which may either be held in the hand or be made to stand of itself; the lady at the same time is relieved of the trouble of holding her handkerchief while the handkerchief itself is receiving the perfume of natural flowers.

CAR COUPLING.—John D. Anderson, Corry, Pa.—This invention relates to a new and improved method of coupling railroad cars.

ROTARY STEAM ENGINE.—J. H. Van Sandt and J. J. Hunt, Princeton, Ind.—This invention relates to the manner in which an uninterrupted action of the steam upon the shaft of a steam engine is obtained whereby the objections to a crank and the difficulty experienced from dead center is overcome.

METHOD OF CONVERTING AND MULTIPLYING MOTION.—H. Burk, Mineral Point, Ohio.—This invention consists in forming an eccentric or zig-zag channel in the sides of a wheel that is attached to and revolved by a rotating shaft, and in constructing a pitman so that it shall receive a rectilinear motion from the wheel by having its end fitted to the irregular groove before mentioned.

SAWING MACHINE.—Henry Hassenpflug, Huntington, Pa.—This invention relates to a portable sawing machine which is to be chiefly used for cross cutting, and for cutting cord wood, and for scroll work, but which may also be changed so as to be used for ripping. The invention consists chiefly in the self-feeding apparatus whereby the wood is gradually fed to the vertical reciprocating saw; also in such a construction of the parts that the distance between the ends and the fulcrum of the lever by which the saw is operated can be changed at will, so as to increase or diminish the power or the speed of the machine as may be desired.

GANG PLOW.—L. B. Lathrop, San Jose, Cal.—This invention relates to a new plow which is constructed with a view of reducing manual labor in plowing and to secure an ease of draft not heretofore attained.

BATH TUB.—John Carroll, New York City.—The object of this invention is to construct a bath tub of sheet metal and wood in such a manner that it will be durable, light, and easily packed for transportation.

PENCIL SHARPENER.—Hubert Burgess, San Francisco, Cal.—The nature of this invention consists in constructing a device by which slate and lead pencils, also crayons, may be sharpened in the most perfect and expeditious manner.

APPARATUS FOR REMOVING WATER AUTOMATICALLY FROM THE HOLDS OF VESSELS.—H. L. Stibbs, Savannah, Ga.—This invention has for its object to furnish an improved apparatus by means of which water may be removed from the holds of vessels automatically.

MACHINE FOR STAMPING CLAY DOOR KNOBS, ETC.—George Lawton, Trenton, N. J.—The object of this invention is to construct a machine whereby door knobs and other articles of clay may be formed or stamped in the most simple and efficient manner, completing the door knob or other articles as far as the working in clay is concerned. The invention consists in such an arrangement of the machine that the stamping process may be perfect; the upper die falling down three times with variable force so as to completely finish the article. The machine is also so arranged as to prepare the holes in the knobs or other articles for the reception of the shanks of said knobs or other articles.

WAGON-BRAKE LOCK.—Thomas Urie, Springfield, Iowa.—This invention relates to an improvement in the construction of locks for operating the brake on a wagon wheel.

CORSET.—James P. Love, New York City.—This invention consists in laying each steel of a corset between two flaps which are left on the corset, and in then hooking the outer flap to the body of the corset so that the steel is firmly held in place. By simply unhooking the said flap the steel can be at once released from the corset.

BUTTER WORKER.—S. H. Wade, Montgomery Center, Vt.—This invention has for its object to furnish an improved machine for working butter, cheap, simple in construction, durable, and not liable to get out of order, and which will do its work quickly and thoroughly.

TANNING APPARATUS.—Abraham Steers, New York City.—This invention relates to an apparatus in which the hides or skins are distended upon a cloth within a wired frame of suitable metallic substance, whereon they are subjected to the action of reciprocating platens or faces of rammers, in such a manner that they are repeatedly compressed, the spent tanning liquor squeezed out, and fresh tanning liquor of the requisite strength admitted to their tissues, the process of tanning being thereby most materially accelerated with a great saving of time and labor.

HOISTING APPARATUS.—Joseph A. Dayton, New London, Conn.—This invention has for its object to furnish an improved machine for use in store houses and in other places for hoisting heavy weights with a comparatively small exertion of power, and which shall be simple in construction, strong, and not liable to get out of order.

ROTARY ENGINE.—Thomas Banta, Hoboken, N. J.—This invention has for its object to furnish an improved rotary engine so constructed and arranged as to utilize the expansion of the steam and avoid the difficulties arising from the back pressure caused by the condensation of the steam upon the interior surface of the cylinder, and its subsequent expansion into steam.

GATE.—Gideon S. Granger and William Northrop, Wayland, N. Y.—This invention has for its object to furnish an improved gate so constructed and arranged as to require no hinges, and which may be raised up so as to allow small stock, such as sheep and hogs to pass through, while it prevents the passage of cattle, horses, etc., and so as to prevent its being clogged by snow.

WINDOW SASH FASTENER AND LOCK.—Ezram Johnson, Joliet, Ill.—This invention has for its object to furnish an improved window sash fastener and lock so constructed and arranged that it will hold the sash at any desired elevation; and which when the sash is closed will hold it securely locked.

DRAFT EQUALIZER FOR HORSE POWER.—Archibald Stewart, Troy, Wis.—This invention has for its object to prevent breakages in the machinery of threshing and other machines driven by horse power, from the strain caused by the sudden starting or jerking of the horses.

CLUTCH.—Albert Heth and Gaylon Hall, Adam Center, N. Y.—This invention relates to a device, which is to be used for suspending hay forks from rafters, but which may also be used advantageously for other similar purposes. The invention consists in the use of a metal frame, from which a swivel hook is suspended, to which the fork or other article may be hung. Two pointed rods are secured to the top of the frame, one being attached to a sliding brace, that is operated by a screw; these points can be brought against the opposite sides of any rafter or beam, and thus the clutch is held on the rafter and supports the fork by the swivel hook.

SECURING THE TINES OF HAY FORKS OR RAKES.—J. P. W. Riley.—Monrose, Pa.—This invention relates to a new manner of securing the tines or prongs of hay or manure forks, rakes, potato hooks and other similar articles, to the handle. This consists in making the tines or prongs out of two pieces, and scarfing the same together, within a mortise or slot in the handle, and driving keys or wedges behind them, so that they will be securely fastened to the handle. Should one of the tines break it can be easily renewed without throwing all away.

HARROW.—D. S. Fisher, Cedar Spring, Ind.—This invention relates to a harrow of that class which relate and are commonly termed revolving harrows. The invention consists in a novel construction and arrangement of the parts composing the same whereby the harrows are allowed to rise and fall, to conform to the inequalities of surface over which they may pass, and also rendered capable when required, of being secured in a higher or lower fixed position, so that the teeth may penetrate more or less deeply into the earth.

SPINDLE.—Joseph Smith, Loth, Belgium.—The object of this invention is to regulate the tension of the thread as the same winds on the bobbins, spools or tubes in machines for spinning, doubling and spooling wool, cotton and other fibrous materials whereby a softer thread is obtained than on the spinning machines constructed in England under the name of cap frames.

APPARATUS FOR TEMPERING STEEL SPRINGS.—Ira N. Bevans, Litchfield, Conn.—This invention relates to an apparatus which steel springs are tempered by drawing them through a vessel containing melted lead. In ordinary apparatus of this kind, the spring on leaving this vessel, is wound on a drum which receives a positive revolving motion by gear wheels or belts, and as the spring winds on the drum, it is drawn through the melted lead. By this operation the operation of tempering the springs is not uniform, because the diameter of the drum increases and the spring is drawn through the lead quicker and quicker so that it becomes too soft at the beginning and remains too hard at the end of the operation.

STUMP EXTRACTOR.—Isaac Pardee, Vineland, N. J., and R. C. Parvin, Forest Grove, N. J.—This invention relates to a machine for extracting stumps, elevating stone, and lifting or raising other heavy bodies. It consists of two rack bars fitted in a socket provided with pawls, and placed loosely upon a suitable framing, the rack bars having a lever attached to their lower ends, and all so arranged that a very simple, economical, and efficient device for the purpose specified is obtained.

FAUCET.—Alexander Brinckmann, New York City.—This invention consists in applying a spring to the spigot of a faucet, and also in applying stops thereto, whereby the faucet, when opened to draw liquid from a cask or vessel, will be immediately closed to stop the flow when the hand is withdrawn from the handle of the spigot, and the faucet be allowed to close entirely to stop any flow of liquid, or, when the faucet is applied to water pipes, be allowed to remain a trifle open to admit of a small stream of water flowing to prevent the freezing thereof during the winter season.

CUTTING BOLTS AND RIVETS.—Walter Britton, Abingdon, Ill.—This invention relates to a device for cutting bolts and rivets, and consists in a peculiar construction of parts, whereby a very simple, portable, and efficient device is obtained for the purpose.

MACHINE FOR SPLITTING WOOD.—Leonard Tilton, Brooklyn, N. Y.—This invention relates to a machine for splitting wood for fire-kindling purposes, and it consists of two reciprocating V-shaped knives or cutters, and a swinging holder, arranged in certain relation with a hopper and operator, whereby wood may be split into small or thin square pieces very expeditiously, and with but a moderate expenditure of power.

SURFACING OR LEVELING RAILROAD TRACKS.—S. L. Porter, Rochelle, Ill.—This invention relates to a new and improved device for the purpose of surfacing or leveling the tracks of railroads.

RAILROAD CAR SEAT.—Jesse S. Wheat, South Wheeling, West Va.—This invention relates to an improvement in railroad car seats, and consists in certain devices for reversing and holding the back of a seat in different positions of elevation or inclination to adapt it for the support and comfort of the person occupying the seat, instead of being confined to one position, as reversible seats are of ordinary construction.

LOCOMOTIVE PILOT.—B. F. Partridge, Jr., Columbus, Ky.—This invention relates to an improvement in the construction of a pilot for a locomotive engine, and consists of a series of inclined rollers on the sides of a wedge-shaped frame, similar in its general form to the pilot usually attached to the front of locomotives for the purpose of clearing the way of obstructions on the railroad track.

WHEAT DRILL.—D. S. Fisher, Cedar Spring, Ind.—This invention relates to a drill for drilling in wheat and other grain. It consists in the use of a rotary shaft, provided with pins, in connection with a seed-distributing slide, all arranged to effect the desired end.

MANUFACTURE OF CHEESE.—Sylvester Greene, Rome, N. Y.—This improvement relates to the means employed for expressing the whey from the curd, whereby the rich or buttery portion of the curd is retained. It consists in placing in the box or vessel, in which the curd is produced as usual by the application of rennet, a perforated plate and a strainer, if necessary, the plate, and also the strainer, if one be used, resting upon the curd, and by their own gravity alone, or with additional weight if necessary, be made to exert a very gradual pressure on the curd, so that the whey will pass up through the perforated plate.

MACHINERY FOR CUTTING WOOD MOLDINGS.—George S. Hudson, Ellisburg, N. Y.—This invention relates to improvements in machinery for cutting waved and serpentine wood moldings.

PLOW.—D. S. Fisher, Cedar Spring, Ind.—This invention relates to a new and improved plow of that kind designed to be attached or applied to a frame mounted on wheels, and to consist of one or more plows. The invention consists in a novel construction and arrangement of parts whereby the plow is placed under the complete control of the operator or driver.

CUTTING SHEET LEAD.—S. E. Chubbuck, Roxbury, Mass.—This invention relates to a new means for cutting sheet lead transversely during the rolling or milling process, whereby said work may be done with the greatest facility.

SLEEPING-CAR BED FOR RAILROADS.—J. Wyatt Reid, New York City.—This invention relates to a novel method of constructing and arranging the beds in a railroad sleeping car, and consists in forming the beds of canvas or other suitable material, attached to rods or chains in such a manner that they may be conveniently suspended for sleeping in, and taken down and packed away as may be necessary.

ADJUSTABLE SHOE SOLE AND LIFT.—Charles B. Loveland, Elizabethport, N. J.—This invention relates to improvements in the manufacture of shoes, boots, etc., and consists in attaching an extra sole to a single sole by means of a metal plate fastened with screws, and also inserting a metal plate lift and tap secured to it in such a manner that the metal plate lift and tap on the heel of the shoe on the one foot may be shifted and adjusted to the shoe on the other foot in on order to equalize the wear on the sides.

HORSE HAY RAKE.—Israel L. Bullock, Mercy, Ind.—This invention relates to a revolving horse hay rake, and it consists in a novel arrangement and application of the rake whereby it may be actuated or controlled by the feet of the driver, and with the greatest facility.

DEVICE FOR TRANSMITTING MOTION.—Leonard Tilton, Brooklyn, N. Y.—This invention relates to a mechanical device for transmitting a reciprocating motion from a rotary shaft, and it consists in the employment or use of a belt shipper in connection with a cam, on idle and working pulleys, and gearing.

MACHINE FOR CUTTING SLATE.—J. W. Durgin, Bangor, Maine.—This invention relates to a machine for cutting slate for roofing purposes, and it consists of a knife attached to a suitable bed-piece, and of such a shape as to cut the slate in the form required, the knife being attached to the bed-piece by pivots, and operated through the medium of a lever or treadle.

CLOTHES-WASHING MACHINE.—Robert Rooke, Empire City, Oregon.—This invention consists in a series of pounders arranged in connection with a rotating perforated tub which is placed within a fixed or stationary tub, the pounders and rotating tub being operated from one and the same driving shaft, and all so arranged that the clothes may be cleansed very expeditiously and in a perfect manner.

CORN PLANTER.—D. S. Fisher, Cedar Spring, Ind.—This invention relates to a machine for planting corn and other seed in hills or drills, and it consists of a novel seed-distributing device and a covering mechanism to accomplish the desired end.

DEVICE FOR HOLDING CLAPBOARDS.—William H. Cummings and Isaiah Babcock, Boonsboro, Iowa.—The nature of this invention consists in a new and useful clamping device for gaging and holding weather-boards or siding when put on a building for the purpose of securing them on each other evenly and expeditiously.

BALE TIE.—Henry Lampson, London, England.—This invention consists in so arranging two metal loops or rings, which are similar in form to the "sliding loops" of leather used with leather straps, that by means of these loops or rings the ends of the metal bands are firmly held and clamped.

METHOD OF CHILLING OIL.—John E. Richardson, New York City.—This invention relates to a new manner of chilling all kinds of oils so that they may be kept in a fluid state after having undergone this process. It is adapted more particularly to the production of paraffine from petroleum or other hydro-carbon liquids, but may also be used with the same effect in the treatment of lard from animal oils.

VEHICLE.—John S. Campbell, Newton, N. Y.—This invention consists in making the body of a carriage or sleigh, and also the carriage wheels or sleigh runners of hard rubber in such a manner as to produce a durable and elegant carriage or sleigh with comparatively little trouble or expense.

THE MANUFACTURE OF SULPHURIC AND OTHER ACIDS.—John Hughes, Brooklyn, N. Y.—This invention relates to an apparatus for concentrating sulphuric acid to any desired degree; and which may also be used for any other kind of acid.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisements at 50 cents a line, under the head of "Business and Personal."

E. R., of Wis.—The earth has the form of an oblate spheroid, of which the equatorial diameter is about twenty six miles longer than the polar. The bulging out toward the equator is generally conceded to be due to the centrifugal force of the earth's revolution. The water in the equatorial ocean is about thirteen miles higher than in the polar ocean. The ocean current moving from the north pole southwardly is running up hill (up hill being defined away from the center of the earth) and if the current travels to the equator, it has run up thirteen miles. A river running south in the northern hemisphere has a tendency to wear on its western bank.

J. W. L., of N. Y.—The force given out by condensed air on expansion is precisely equal to the force which was used in the compression, provided that none of the heat of compression has been lost. The form of vessels used or the rate or manner of compression or expansion, do not affect the question one way or the other.

H. H. B., of Iowa.—Your proposed chimney 48 feet high by 30 inches diameter will surely give you draft enough to burn saw dust.

J. Mc. C., of Wis., is much annoyed by leakage of valves of his engine. The valves are brass and the seats iron. The leakage is caused by the unequal expansion of iron and brass. The valves should be replaced by iron valves. Brass valves are now generally discarded.

G. B. N., of Texas, asks how he can consume the smoke from his boiler furnace made by burning pine shavings. Construct behind your fire box a combustion chamber through which the smoke must pass and feed it with atmospheric air through apertures the sizes of which may be controlled by dampers.

H. H., of Wis.—We are not responsible for the published opinions of our correspondents, and in the case you quote we differ with the writer if he means what he says in the portion of the sentence you quote; that "a boiler will make steam faster when the pressure is high than when it is low, with the same fire." Probably his meaning is to be seen, in the remainder of the sentence; "so it is economical to carry a high pressure—even if it is not necessary to do the work—and to work the steam expansively." It has been pretty well established that it is economy to use high pressure steam, but we not think the same fire will generate more under a pressure of 100 lbs. than under one of 50 lbs.

L. J. O., of Minn., is troubled by the overflow or the creeping over of the oil in his lamps, and wants a remedy. The smearing of the upper part of the lamp with a substance which is repulsive to oil migh be effectual. Try the white of an egg or gum arabic.

C. F. R., of Conn., sends us a sample of printing paper made from sedge or marine grass grown in Norwalk harbor. When cured the hay is sold for $3 per ton. The paper is manufactured by Henry Betts, Norwalk, Ct.

R. V. M., of Conn.—You cannot make the best quality of sealing wax, if you omit the shellac. Sealing wax without shellac is brittle.

D. L. M., of N. J.—Spirit varnishes have often been used as substitutes for ordinary blacking for shoes, and answer admirably for one or two applications. The objection to the continual use of the varnish is that its resinous matter fills up the pores of the leather, rendering it stiff and rough.

R. S., of N. Y.—There is no standard recipe for making what is called Babbitt metal. The name simply indicates an alloy of certain properties or uses without reference to its exact composition. Antimony generally enters into the composition, but is not essential. Zinc is nearer in properties to the Babbitt metal than any other simple metal.

S. V. L., of Vt.—There are many exceptions to the law that alloys melt at a temperature below the mean melting points of its constituents. . . . . wrought iron may be melted, and cast into molds, but the operation is not practicable on account of the intense heat required. If we could easily produce the heat to melt wrought iron, what could we melt it in or keep it in?

R. G. G., of N. Y.—Telegraph wires are now every where made of iron. A perfect coating of the iron with copper would no doubt be useful, but more for the purpose of protecting the iron from rust than for increasing the conducting power.

S. B., of Ill.—A blow pipe produces a greater intensity of heat by reason of its furnishing the air for more combustion within a given space and time. Whether a given amount of air should issue into a furnace from two or more tweers, would depend mainly upon the size of the furnace and the work to be done. Where the object is to bring the whole body of fuel into equal and vigorous combustion the greater the division of blasts of air the better. Most blast furnaces may be improved by multiplying the number of tweers.

A. Y., of Vt.—We are not acquainted with a late work on "Natural Philosophy by Prof. Comstock" and therefore cannot give an opinion on the centrifugal pump to which you allude.

P. P. C. C., of Eng.—The specimen of dry lubricant which we have received appears to be a very useful article.

G. S. W., of Pa.—Sends a diagram representing a train of gearing. The first member of the train is a worm or screw acting on a wheel of a hundred teeth. One hundred turns of the worm revolves the wheel once. The axis of this wheel is a worm acting on a second wheel also of a hundred teeth. The axis of the second wheel is likewise a worm acting on a third wheel of a hundred teeth. Suppose the worm No. 1 revolves 100 times in a minute what is the rate of revolution of wheel No. 3?

W. W. & Co., of Texas.—If you think it would pay to manufacture ice in Texas at an expense of four cents a pound for materials, the requisite information may probably be obtained by writing to M. Foselli, manufacture of *Glacier Roulante*, at the Great Exhibition, Paris.

W. B., of Ill., disputes with a friend concerning the philosophy of the siphon, and we are appointed umpire. "Does the siphon work on the same principle as the common suction pump?" Yes. In the pump the lifting of the piston or sucker produces or tends to produce a vacuum, and the pressure of the atmosphere forces the water up the barrel to prevent or fill the vacuum. In the siphon it is the greater weight of water in the long leg, which tends to produce the vacuum, and the pressure of the air which forces the water up the short leg to fill it. The force which raises the water in both cases is the same—the weight or pressure of the air. As the pressure of the air per square inch is only equal to the pressure of a column of air 34 feet high and 1 square inch in section, neither the pump nor the siphon can raise water higher than 34 feet.

F. R., of N. Y.—You ought to have no difficulty in using tinsmith's solder in soldering the connections of the zinc plates of your battery. Use with it the common soldering fluid, a solution of chloride of zinc.

G. W. V., of Miss.—To restore the softness and pliancy of leather which has become hard by having been wet, apply neat's foot oil and rub it in. The luster of morocco is restored by a varnishing with the white of an egg.

E. D. H., of——.—inquires whether the top of a wagon wheel moves faster than the bottom while attached to an axletree and running on a road. Certainly it does. On page 231, current volume, April 20, this question was answered in a reply to T. M. S. Jr., of Ga. You can prove it by placing a straight-edge upright at the side of a wheel across the center, and mark on the rim, where the straight edge touches top and bottom, and then draw the wagon forward far enough to turn the wheel slightly. You will find the mark at the top of the wheel has traveled much farther from the straight edge, than that at the bottom.

D. A. McK., of Pa.—We think you can break up your casting by drilling a few holes of three-quarters or one inch diameter from six to ten inches deep, filling them nearly to the top with water and then inserting carefully fitted steel plugs to rest on the top of the water. A blow from a heavy drop will probably do the business. In your case the mass of iron is three feet square; perhaps inch holes, drilled ten inches deep, and filled to within two inches of the top would be effective. The steel plug should be about four inches long and fit as nearly water tight as possible.

Business and Personal.

The charge for insertion under this head is 50 cents a line.

Manufacturers of clock work to run light machinery send address to A. S. Griswold, Pittsburgh, Pa.

Makers of Brass Lamp Tops address A. Packham, Prestonsville, Carroll county, Ky.

Wanted—Manufacturers of Agricultural Implements of all kinds. See advertisement and address A. P. Smith, Sterling, Ill.

Wanted—The address of Mr. Snow, patentee of Match Safe, dated April 19, 1864. Address J. Maclaren, Scranton, Pa.

Manufacturers or dealers in machinery for the manufacture of tubs, buckets and firkins, please send their address to D. S. McDaniel, Kachusa, Lee county, Ill.

Small Emery Balls Wanted.—Address Box 258, Troy, N. Y.

Jos. Lees, 417 East 10th street, New York City, alleges that he has valuable improvements in manufacturing gas from coal, and he wishes to engage with some company where his services may be appreciated

Improved Electrical Machine.

The apparatus represented in the engraving is a novel device for generating frictional or static electricity. It is of simple and cheap construction, and is far more powerful than the ordinary machine. It is without doubt the most important addition to the apparatus for generating and illustrating static electricity which has been made since Franklin's time.

In appearance it resembles the ordinary plate machine. In fact the most prominent part is a glass disk which is mounted and revolved in the usual manner. But the plate is thinner—the thinner the better—and as it is desirable to revolve it very rapidly, a multiplying wheel is connected with the plate so that one turn of the crank shall give four or more revolutions of the plate.

The machine has no rubbers; it produces torrents of frictional electricity, but the electricity is not generated by friction; there is no friction about the machine except at the axle bearings. The plate revolves in free air, and nothing should touch it. In the place of rubbers are what are called inductors, which are strips of paper three or four inches long and about one inch wide. They are supported and insulated on pieces of glass which (in the figure) are of spear-head form. The inductor is made complete by pasting on to the paper pointed pieces of card board which project beyond the glass spear heads an inch or two. The spear heads are attached to the framework of the machine so that they shall be parallel and as near as possible to the plate on its crank side. In the figure, four inductors are represented, each having two card points all turned in the same direction.

Opposite the inductors, at the front of the plate, are the comb points which serve to collect the electricity and convey it to the conductors for use. Each inductor is furnished with its set of points. The combs are attached to brass rods terminated at their other ends by brass balls. The rods are fastened to the framework of the machine and are insulated from it. The balls at the ends of the rods may be connected to each other in any desired order by means of bent wires.

The machine is put in action by slightly electrifying any one of the inductors by means of an excited rod of hard rubber, glass tube, or otherwise, and turning the crank. Its power progressively increases for about a minute, and until it reaches the maximum, when it furnishes a steady supply of electricity as long as the disk is revolved. The amount of electricity which a disk of only two feet in diameter will yield is almost incredible to one who has not witnessed it. It rushes between the terminal balls or poles when arranged as in the figure, as a perfect but steady torrent of purplish blue fire, or by a slightly different adjustment, in balls of dazzling lightning, each discharge being accompanied by a report like a torpedo.

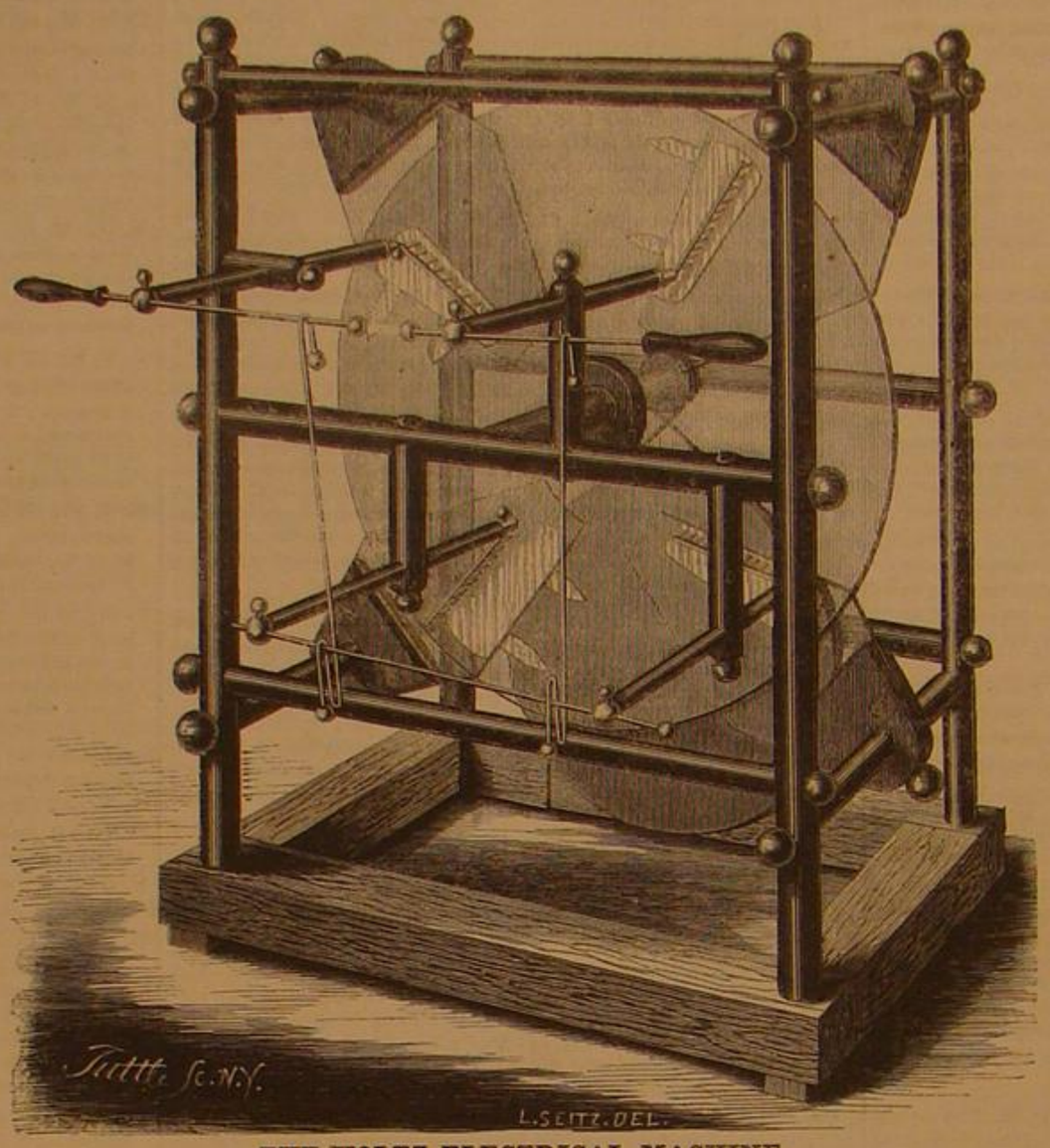
Now for the explanation of the action of the machine. There are three elements which are chiefly to be considered—the inductor. the plate, and the comb points. What are their relations towards each other? If a pointed wire be brought opposite an electrified body, as, for example, a prime conductor, we say that the electricity is discharged on the point, or that the electricity is attracted by the point. Or we may say the + electricity of the prime conductor attracts the — of the wire and repels its +, and a stream of — flows out of the wire at its point, while the + flows to the opposite direction. Now suppose a sheet of glass be interposed between the point and the conductor. The attraction of the + of the conductor for the — of the wire, is by no means lessened; the — is accumulated towards the point, and by reason of its higher tension flows out on to the glass. But the glass is impervious to the electricity, and it remains on its surface; the glass becomes electrified.

Now, in the Holtz machine we have the electrified body in the inductor, the wire point opposite, and the glass plate interpose. Suppose inductor No. 1 electrified +, this + attracts — out of the comb points on to the interposed plate. The plate moving on, the part electrified — comes opposite card points of inductor No. 2. Here — of the plate draws out of the card points + on to the glass, and inductor No. 2 becomes charged —, while the glass is — on the further side and + on the near side. Inductor No. 2 being charged — draws + out of comb points No. 2, and neutralizes the — drawn from comb points No. 1. Card points No. 3 discharge — on the plate, and inductor No. 3 becomes +, and like No. 1 draws — out of its corresponding comb point.

It will be seen that the alternate inductors are oppositely electrified, and that their corresponding comb points, give out or receive accordingly. By varying the manner of connecting the balls at the extremities of the comb points a considerable variety of changes in the relation of the quantity and intensity may be obtained. These variations are somewhat similar to those which are secured by varying the order of connecting the elements of the galvanic battery. The adjustment in the figure is that for greatest intensity. By connecting one of the poles with the ground the other may be used as a prime conductor for charging Leyden jars, etc. It is found advisable, in order to secure more perfect insulation, to varnish the plate and the inductors with shellac varnish.

In the original Holtz machine the inductors were arranged on a disk of glass in which holes or windows were cut to permit of the action of the card points. The new machine was invented in 1865, and it was briefly noticed in German publications in the fall of that year. The first complete description was published in Poggendorff's *Annalen*, in March, 1866 The inventor, W. Holtz, is a distinguished physicist, and resides in Berlin, Prussia.

The machine from which our drawing was made is an elegant specimen of workmanship and was constructed by Messrs. C. T. & J. N. Chester, of New York City. The base is wood and the framework hard rubber.



THE HOLTZ ELECTRICAL MACHINE.

What is the Matter.

Notwithstanding the great number of patents issued weekly the back work of the office is not being brought up as it should be. The Commissioner has authority to appoint a sufficient number of Examiners to do the work of the office, why does he not do it? Inventors who applied for patents several months ago ask the question. Who can answer it?

IMPROVED STITCHING CLAMP.

The object of this invention is to obviate the objections made to the ordinary sewing clamp, that the jaws are obstructed by springs and straps, so that articles requiring depth of space, as dash boards, boot legs, etc., cannot be conveniently held; that the strap is liable to be broken in endeavoring to close the jaws, and that it is injurious to the foot and leg of the operator. By the improvement represented in the engraving, articles one foot or more in depth can be inserted in the clamp; no spring is used, the tension of which must be overcome every time the jaws are closed; it has no ratchet teeth to tear the clothing, and it is self-retaining in all positions.



The horse, A, is of the usual style, having one firmly fixed jaw, B, and one movable one, C, hinged to B, just under the seat. The lower end of C, is hinged to the treadle or lever, D, both ends of which project beyond the sides of the frame of the horse. To the under side of D, about in the center of the frame, the auxiliary lever, E, is hinged, and it is secured to the rocking bar, F, which turns on pivots in two of the legs, or it may be hinged to a permanent bar or brace. This arrangement of the treadles forms a powerful toggle joint.

It will be seen that a slight pressure of either foot on the projecting portion of E, or the projecting end of D, on the opposite side of the horse, will open the jaws, while pressure on the other end of D will close them. The lever, E, may be made adjustable, to fit thicknesses of work which vary greatly, by having it slide through the mortise in the bar, F, and securing it by a pin passing through the bar and lever. By a slight alteration in the position of the levers they may be attached to a foot block, supporting upright clamps for closing shoes, used by women and children sitting on a stool or chair. This machine is so simple that it may be made by any one capable of handling wood tools, as there is no iron work about it but three or four common butt hinges. For stitching buckle straps and other articles requiring frequent removal, this clamp is well adapted, as the jaws can be worked very rapidly.

Patented through the Scientific American Patent Agency Oct. 23, 1866, by William W Taylor, whom address for rights, etc., 274 Broad street, Newark, N. J.

The Cholera.

From a recent report by Dr. Harris of the New York Board of Health we learn that about four weeks ago cholera reappeared in London and in Paris, but it is reported not to have spread to any extent. In the town of Elberfield, near the Rhine, and about eighty miles southeastward from Rotterdam, the epidemic appeared and has spread to some extent. That town is in a region that sends many emigrants to New York by way of Rotterdam and Liverpool.

These facts can be understood by our people without awakening anxiety or fear, for "to be forewarned is to be forearmed," and although there may be numerous cases of cholera imported from the South and elsewhere, and though there may be repeated outbreaks in the lower regions of the Mississippi, the means of sanitary protection are definite, ample, and easily applied. But wherever, in places that are ready for the kindling of the epidemic, the true means of sanitary protection are not applied, the pestilence may yet make deadly ravages. The watchword of the Metropolitan Board of Health, "timely, active and preventive measures," should be adopted by every city and town to which the epidemic can come.

Scientific chemists and experimenters, and all well-informed sanitary officers now agree that saturated solutions of copperas and carbolic acid are at once the best and cheapest disinfectants that can be used against cholera.

Preparing Oxygen.

We may call the attention of our readers to a process for preparing oxygen which is very simple and inexpensive. It was proposed some time ago, by Mr. Mallet, to take advantage of the well-known fact that subchloride of copper, when exposed to the air, absorbs a large quantity of oxygen, producing an oxychloride of the metal. The latter when gently heated, readily parts with the oxygen which it has absorbed, and returns to its original condition. Thus, by alternate exposure to the air and heating, it can be made to play the part of an effective separator of oxygen from the atmosphere. We will now give a few details of the new process.

PREPARATION OF SUBCHLORIDE OF COPPER.—This salt is prepared with moderate facility by digesting four parts of finely-divided metallic copper and five of the common black oxide of the metal in hydrochloric acid. Prolonged digestion is required in order to effect this object, to gether with the presence of a sufficient excess of acid. The whole is evaporated to dryness as quickly as possible, and the dry residue preserved for use.

PREPARATION OF OXYGEN.—The subchloride of copper, prepared as above, is very finely powdered and intimately mixed with half its weight or rather more, of fine white sand. A little water is then added, and the mixture well agitated in a large vessel. After a few hours it will have absorbed all the oxygen from the air which it is capable of doing; and, when required for use, the mixture should be placed in a suitable gas-generating vessel, and gentle heat applied. Oxygen is then steadily given off in considerable quantity, and may be collected in the usual way.

The residue in the retort, when moistened with water and exposed to the air as before, absorbs a fresh quantity of the gas, which may be obtained again by heating, and this succession continued for a considerable time.—*British Journal of Photography.*

A TOBACCO POUCH WANTED.—A correspondent from Maryland, evidently an admirer of the "filthy weed," wants inventors to conjure up a better tobacco pouch than is to be found in the market. He says it should be neat and handy, having a mouth of metal, and should be so constructed as to fill a pipe without spilling the tobacco.

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NEW YORK, SATURDAY, JUNE 15, 1867.

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STREET PAVEMENTS.

Columbus, Ohio, Jefferson, La., and New Orleans, as well as the common council of the city of New York, have joined in the rush for the Nicolson pavement. In the former city we are told that High street is to be Nicolsonized at an expense of $80,000. The city of Jefferson advertises a contract to pave one of its streets on this system, with another for wooden curbs to the sidewalks. In New Orleans and Chicago —two of the worst places in general for the endurance of wood on the ground—this pavement is commonly reputed to give entire satisfaction, and it is from experience in New Orleans that the action taken in the city of Jefferson has resulted.

The charms of the Nicolson pavement are almost overpowering to the judgment. Exemption from the deafening din which multiplies the labor of business between man and man, from the incessant jar which impairs the nervous system, from more than half the present cost of hauling goods and deterioration of horses and vehicles, and from the putrid accumulations in pavement crevices which turn to dust under the heat of the sun and destroy goods and clothing enough (to say nothing of health) to pay the whole cost of maintaining and daily sweeping a smooth pavement of the right sort: these are considerations which seem to decide men in favor of the economy of the Nicolson pavement, on less testimony from practice than they are willing in most cases to be satisfied with.

True, the reported testimony of experience in western cities, where this pavement has been longest tried, is, as we have before said, very strong. But there is another side to the question. We have before us a letter from a correspondent in Detroit, who presents it in this shape:—"I have examined the Nicolson pavement in Chicago, and have seen whole streets of it, that have been down five or six years at most, and are now completely used up by travel and rot." If this be true—and there are enough of our readers who know the facts which would verify or refute the statement—the mischief to public health from such vast masses of decaying vegetable matter could not be compensated by any advantage whatever.

It is possible that on well-drained sandy foundations, a wood pavement thoroughly packed in bituminous concrete may defy moisture and decay. But on the whole, the nature of wood and street soil together seem to be against the probability, and to indicate that in this respect at least, the Nicolson pavement is not perfect. It appears to us that the desideratum is to kyanize the wood by some process at once cheap enough to be practicable and efficient enough to insure it against decay. No doubt the owners of the Nicolson patent are alive to this necessity, but they may naturally be unwilling to burden their proposition with an additional cost that would probably defeat it altogether.

The problem is an interesting one to inventors. But let not their pains and ingenuity be thrown away in the dark. Few subjects, they should understand, have been so much studied and with so little success, as the paving of streets. No subject requires more practical knowledge and specific experience. It is of no use for people who know nothing of the paving business, however ingenious, to present their theoretical plans. We have before us a confident opinion that a perfect street would be made by plating the surface with iron. No wonder this correspondent complains that his suggestions are neglected. Iron pavement, far more ingeniously devised, was tried in this city years ago at great expense, with high hope and with ignominious failure. Iron sidewalks have also been tried by individual lot owners, and now exist as a nuisance to pedestrians, traversed even for a few feet with toil and peril. Stone has been tried in every shape, in every position and on every basis, and the deep, narrow-faced Belgian block, on a sand bed, remains the only thing tolerable in that line. All remember the renown of the great "Russ pavement" which was for some years the pride of Broadway, but after full experience has been cast to the moles and the bats as one of the worst pavements ever invented. One general law has been settled by all this costly and vexatious experience: *i. e.*, that it is impossible to know that a pavement is good for anything until it has been tried at least ten years on a New York city thoroughfare. This protracted test, the experience of Russ teaches that inventors of pavement must expect to abide, unless their contrivances are lucky enough to fail, as they mostly do, in a shorter period.

A MECHANICAL PARADOX.

Experiments have been going on for months in England, to determine the power of screw bolts to resist a sudden longitudinal strain. In repeated trials of projectiles against targets representing the armor plating of ships, it was found that the bolts which fastened the inner skin and outer plate, broke short off at a point just inside of the seat of the threads in the plate. Major Palliser conceived the idea of turning off the threads on the bolts between the points on the ends which engaged with the plates, thus reducing the diameter of the bolts. The result was almost incredible. It was found that a bolt with a thread cut its whole length became much stronger, or had practically more tensile strength, when the thread betwen the head and the engaging points was turned off, than when it was left on the bolt. Not only so: a smooth ⅝-inch bolt suspended by one end and subjected to the fall of a sliding weight striking the nut at its lower extremity, broke at the second blow, while a similar bolt turned down to ¼ of an inch except the screw end, bore ten blows and stretched ¼ inch in 2¼ inches, before breaking.

The philosophy of this curious result becomes a very interesting question. The unqualified proposition that a bar of iron is stronger after losing a portion of its material, than before, is incredible, but when a portion of that material is nicked or cut, the conditions are materially changed. It is well known to mechanics that if a slight nick be cut around a bar of iron or steel it can be broken at that point by comparatively little force. This is seen every day in the smith's shop in cutting up iron. Take a bar of one and a half inches diameter and cut a slight nick around it, and it may be broken by a few well directed blows of a sledge. But if a bar much lessin diameter be attempted to be broken without first nicking it, the trial will be futile. We have seen precisely the same difference exhibited in drawing bars apart by their ends.

A very little of a substance has very little strength or power of resistance, whether contained in a large mass of the same or taken by itself. Now the force applied to break a clean bar of iron distributes itself through a considerable mass which opposes a considerable resistance. But let this force be concentrated upon a hair's breadth and that will give way as any separate hair's breadth of iron would. The formation of the nick in the surface is the means for this concentration. The forces of the blow passing through the mass, from each side, arrive at the nick, at the bottom of which they meet and unite upon an almost infinitesimal point, and the finer the point or the sharper the cut the less the surface to offer resistance. Now in the case of the screw, the threads are nearly concentric nicks, which offer fine points for concentrating the force of a blow, being the starting of a fracture. Let these nicks be turned out, so as to present a smooth surface, and the force which would have been concentrated at one point, is generally distributed over a comparatively large surface, and the reduced diameter, smooth, actually presents more resistance than the larger diameter nicked.

There are some useful lessons to be learned from these facts. One is that a sharp V thread, weakens a bolt much more than one which has a flat bottom, as the point of the thread presents so much smaller a surface for resistance than the blunt or broad bottom. Another suggestion is that the strongest bolt of a given diameter in the screw, is that in which the body under the thread is a very little larger than the shank. Again, a bolt should not be threaded further than is required for the seat of the thread; any further threading is an invitation to a fracture.

TIN LINED WATER PIPE.

In our last issue we mentioned a trial of this new manufacture which took place before a number of mechanics and scientific men, at the works of the company, foot of West Twenty-seventh street, this city. The results of the trial were entirely satisfactory to all who were present.

The pipe differs from the ordinary lead pipe in being, for its caliber, only about half the thickness of lead, and in being lined throughout with pure block tin, not merely washed or plated with it, but being really a pipe of tin enclosed by one of lead, the two being fused or welded together forming one solid whole. The object of the invention is to furnish a conduit for water free from the sanitary objections to which lead is subject, and also to furnish as cheap a pipe as one of lead That this object has been secured is the opinion of our most eminent chemists, physicians, and others competent to judge.

It is not to be denied that even the purest water standing in or passing through lead dissolves more or less of the metal, the oxide of which is a rank poison. This poison affects different persons in a different manner, some withstanding its influences for a long period while others sooner succumb. Such diseases as neuralgia and rheumatism are more prevalent among those living in towns and cities where the water is brought in lead pipes from a common reservoir, than among those who draw water for household purposes with "the old oaken bucket" directly from a well, and these and kindred diseases have increased since the introduction of water by these means.

While lead can be dissolved by the salts held in solution in all water used for domestic purposes, tin is not subject to these chemical changes. Practically it is as free from these influences as porcelain or glass. The additional cost, however, of tin over lead pipe, and the difficulties attending its application, have prevented its superseding lead pipe. This latter difficulty appears to have been overcome by the ingenious applications of Messrs. Colwells, Shaw & Willard in the manufacture of a combined tin and lead pipe.

The pipe is actually stronger than the lead pipe, as was shown by repeated tests on the occasion referred to, although weighing only about half as much per foot. Plumbers have successfully made excellent wiped joints on it with their ordinary solder, although the melting point of tin is much below that of lead; but success in making perfect joints without disturbing the inner tin pipe is assured by the use of a solder peculiarly adapted to it, which is furnished by the manufacturers of the pipe. The method of manufacture is easily understood. A powerful hydraulic press, worked by a steam engine, stands by the side of a furnace over which is a tank containing the melted lead. Directly under the press is a receiver, at the bottom of which a steel die is placed, the aperture in which corresponds with the external diameter of the pipe. The projecting portion of the press piston fits the receiver, and has a mandrel on its lower end corresponding with the inner diameter of the pipe to be formed. A cone shaped block of pure tin having a hole longitudinally through its center into which the mandrel fits, is placed in the center of the receiver directly over the die, the apex of the cone downward The piston of the press is then lowered until the mandrel engages with the hole in the tin, when melted lead is let in and the receiver is filled to the top of the tin cone. After a few minutes to give time for the melted lead to form a junction with the outside of the tin the pressure is applied and the tin lined pipe comes continuously through the die and is coiled on a reel.

The invention promises much for the welfare of the community at large.

Lock Nuts.

The criticism of our foreign correspondent, "Slade," on the prevalent English mode of arranging the lock nut, in the machines exhibited at Paris, has given rise to a discussion in the English papers. An engineer writes in opposition to placing the thick nut on the outside as a lock nut, maintaining that the inside nut is the one to bear the strain, and must therefore have the strength; while the office of the outside nut is merely to check by its pressure or friction, the disposition of the main nut to work back under the effect of vibration.

The Editor of *Engineering* replies to this view, sustaining Mr. Slade, and explaining that an additional nut is a lock nut only when used against an elastic pressure or a varying strain, and when screwed up so tight as to take the strain off the intermediate nut, and force its thread against the thread of the bolt in an opposite direction to the strain. The pressure of the two nuts against the bolt thread in opposite directions and against each other constitutes the "lock," and the outside nut takes the whole strain until it has yielded sufficiently to bring the inside nut to bear outwardly upon the bolt, when the strain is brought equally upon both. It is therefore evident that the outer nut should be the stronger.

Ericsson's Manual Power Gunboat.

Captain Ericsson has performed many services for his native country, Sweden, for which the legislature has voted him an address of thanks. Among the latest and perhaps the most singular of these services is his plan of a fleet of light-draft gunboats for the innumerable and devious channels along the island-girt coast and among the network of lakes peculiar to that country. One of these boats, iron-clad, is already constructed at Motata. The deck is completely below the water level, and is strongly protected with plating. A sort of oval tube or sheath, open at one end, rises above the deck higher than the water. From this points a 15-inch gun, which does not train, but moves according to the position given to the boat by a rudder so constructed as to turn the bow in the wished-for direction. The motive power is applied by the arms of thirty-two men, who act by a simple mechanism on a screw with four flanges. The power thus obtained is said to be thirty to forty per cent greater than when applied to oars. The advantages of this gunboat are cheapness of construction and maintenance (for of course no fuel is required) and exemption from disordered or injured mechanism. The cost is a little over $20,000.

Information Wanted.

Will the Commissioner of Patents have the goodness to inform us the present condition of the class under which surgical instruments, weighing scales, and dentistry are examined? How many cases have been acted upon by the present Chief Examiner in this department since his appointment several months ago? Applicants for patents in this class await an answer.

STRAWBERY AND GRAPE EXHIBITION.—The managers of the American Institute announce their annual strawberry and grape exhibition to be held at their rooms in the Cooper Institute on the 18th and 19th inst. The special premiums offered for the best collections of named varieties, eight in number, amount in the aggregate to two hundred and twenty-eight dollars. The Board of Managers offer prizes of three dollars each for the best quart of eighteen standard varieties. Fruit from a distance may be addressed, prepaid, to the care of John W. Chambers, Secty. No. 23 Cooper Building.

Patent Claims

ISSUED FROM THE U. S. PATENT OFFICE
FOR THE WEEK ENDING MAY 28, 1867.
Reported Officially for the Scientific American

PATENTS ARE GRANTED FOR SEVENTEEN YEARS, the following being a schedule of fees:—

On filing each Caveat.....$10
On filing each application for a Patent, except for a design.....$15
On issuing each original Patent.....$20
On appeal to Commissioner of Patents.....$20
On application for Reissue.....$30
On application for Extension of Patent.....$50
On granting the Extension.....$50
On filing a Disclaimer.....$10
On filing application for Design (three and a half years).....$10
On filing application for Design (seven years).....$15
On filing application for Design (fourteen years).....$30

In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay $500 on application.

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

65,037.—MACHINE FOR HULLING RICE.—William G. Adams, Franklin, Mass.

I claim the combination of a narrow-outletted hopper, an elastic yielding feed roll, with its corresponding concave, and elastic yielding conveying surface, a rough surfaced cylinder, and a surface opposed to the yielding conveying surface, and extending between the feed roll and the rough surfaced roll nearly tangential thereunto when said parts or their equivalents, are arranged so as to operate substantially as described.

65,038.—APPARATUS FOR SECURING PULVERIZED AND OTHER MATERIALS TO PAPER.—William Adamson, Philadelphia, Pa.

I claim the two endless aprons, E and F, in combination with rollers so arranged that the said aprons will converge towards pressure rollers, D and D', as and for the purpose described.

65,039.—WAGON BODY.—J. H. Aldrich, Nashua, N. H.

I claim the arrangement and combination of said sill, A, with cap, B, for the purpose herein described.

65,040.—TANK FOR STORAGE OF PETROLEUM.—Peter Andrew, Cincinnati, Ohio.

First, I claim the oil tank, so constructed that the oil will rest on the surface of the water and be surrounded by water on its sides, as set forth, when said tank is arranged and combined for discharging into the lower reservoir in case of a fire, substantially as set forth.

Second, I claim, for the purpose of extinguishing fire and saving oil that may be on fire, oil tanks situated in relation to each other, as described, connected by pipes constructed and arranged in such a manner that the oil from the upper tanks may be conveyed to the lower ones, without danger of fire being communicated through these pipes from the upper to the lower tanks, should the oil be on fire at the time of its being transferred.

Third, I claim the construction and arrangement of oil tanks and pipes connecting these tanks, as described and specified, for purposes set forth.

65,041.—MATCH SAFE.—Charles A. Babcock (assignor to himself, D. M. Golden, and D. M. Kenyon), Frankfort, N. Y.

I claim the match-delivering drawer, d, in combination with the spring igniter, h, and finger, l, for elevating the lighted end of the match, substantially as set forth.

I also claim forming a receptacle, l, for the burnt matches upon the removable cover, k, to the hopper, a, so that said burnt pieces may be removed with facility from the match safe, as set forth.

65,042.—STEAM GENERATOR.—G. H. Babcock and S. Welcox, Jr., of Providence, R. I.

First, We claim a steam generator made up of sections of pipes, each of the several sections being composed of a series of inclined pipes, B, and a series of horizontal pipes, C, united at the ends by distinct side pipes appropriate to each section, the several sections, when arranged side by side and connected, forming an intermediate combustion chamber, A, and operating to cause a constant circulation of the water through the pipes in one direction, substantially as described.

Second, In combination with the series of horizontal pipes, C, the series of upright connecting pipes, D, for the purpose of allowing the steam, as formed, to separate from the water and rise to the discharge aperture, arranged substantially as described.

65,043.—TEMPERING UMBRELLA RIBS.—Thomas W. Ball, Morrisania, N. Y.

I claim, First, A tubular opening into which the ribs are introcuced, in combination with gas jets, or other source of heat, so applied as to act upon all sides of such tubes or tubular openings, and temper the umbrella ribs with uniformity, as specified.

Second, A double casing of non-conducting material, in combination with such tubular openings, and heat applied, in the manner and for the purposes specified.

65,044.—METHOD OF TREATING AFFECTIONS OF THE SKIN.—Augustus Barnes, Southington, Ct.

I claim the use or employment of a glass lens for removing flesh marks and discolorations, substantially in the manner described.

65,045.—METHOD OF TEMPERING SPRINGS.—Wallace Barnes, Bristol, Ct.

I claim the employment of one or more coils, as shown and described, in the process of tempering springs.

65,046.—BRACE FOR BORING BITS.—Harry S. Bartholomew (assignor to himself and G. W. Bartholomew), Bristol, Ct.

I claim the protuberance, a, upon the socket, A, with a corresponding depression, a', in the jaws, substantially as and for the purpose described.

65,047.—STEAM TRAP.—Henry W. Bartol, Philadelphia, Pa.

I claim, First, The arrangement of spring, A, in cylinder, A B A' B', so that when the steam enters the cylinder, the expansion of metallic spring, A, will close opening, E, as and for the purpose described and set forth.

Second, The spring, A, held and secured in proper place by means for ring bosses, K, and bevel notch, R, as and for the purpose described and set forth.

65,048.—LATHING APPARATUS.—W. L. Beardsley, Binghamton, N. Y.

I claim the construction and use of the apparatus herein described and set forth.

65,049.—WASHING POWDER.—Henry Benter, Pittsburgh, Pa.

I claim a washing powder or compound composed of sal soda, or its chemical equivalent, cuttle-fish bone, and ultra marine, or other equivalent coloring matter, mixed in about the proportions above stated, and substantially in the manner and for the purposes hereinbefore set forth.

65,050.—PLOW.—R. W. Biggs, Jacksonville, Fla.

I claim the combination and arrangement of the slotted stock, C, point or share, E, and semi-circular stationary adjusting plate, D, with each other and with a suitable plow beam, A, substantially in the manner and for the purpose herein set forth.

65,051.—MECHANICAL MOVEMENT.—P. Bloomsburg, Jr., and J. Molyneux, Bordentown, N. J., assignors to Bordentown Machine Co. Antedated May 16, 1867.

We claim the single eccentric, B, on the driving shaft, the eccentric rod, C, lever, D, and rod, F, in combination with the double crank on the driving shaft, the whole being arranged and operating substantially as and for the purpose set forth.

65,052.—SEWING-MACHINE SHUTTLE.—Ezekiel Booth and Job A. Davis, Watertown, N. Y.

We claim the longitudinal spring, s, with the socket, B, attached, for the purpose of securing the bobbin, constructed and operating substantially as as set forth.

65,053.—GARDEN HOE.—James H. Brewer, Atlas, Mich.

I claim turning up the ends of the blade, and forming upright cutters at right angles to the main blade, in combination with attaching the shanks to the outer and upper portion of the turned-up end of the blade to clear weeds and earth.

65,054.—CANAL LOCK.—John Burt, Detroit, Mich.

First, I claim discharging the water into and from the lock chamber of a canal in a diffused or divided state by means of a diaphragm or apertures formed in the bottom of the said chamber, substantially as shown and described.

Second, The herein-described mechanism discharging the water into and from a canal lock, the same consisting of tubes or conduits communicating with the higher and lower levels of the canal, and extending along the bottom of the lock chamber, and perforated so as to allow the water to enter or be drawn off from the said chamber at several points simultaneously and in a diffused state, substantially as shown and set forth.

Third The combination with the said tubes or conduits, of the valves for regulating the flow of water, the said valves, at each end of the tubes, coupled or united together so as to be operated simultaneously, substantially as shown and set forth.

Fourth, The combination with a tubular valve seat in which apertures are formed, diametrically opposite each other, of a tubular valve provided with corresponding apertures, the said valve and valve seat being arranged for operation relatively to the water tube or conduit, substantially as shown and specified.

Fifth, The water gate herein described, the same being made of steel or other suitable elastic material, and having a curved shape, as specified, so that when under pressure the sides of the said gate shall be held firmly and tightly against the quoins or guides in which it slides, substantially as shown and set forth.

Sixth, The combination with the elastic water gate, sliding vertically in in quoins or guides of the compensating weight for equilibriating the said gate, substantially as shown and described.

65,055.—FIRE-PROOF SAFE.—William H. Butler, New York City.

First, I claim the tesselated work or interspersed masses of steel united with a softer metal, B, by being rolled or forged together and afterwards hardened by sudden cooling so as to form a conglomerate metal of unequal hardness, the masses being arranged substantially as and for the purpose herein specified.

Second, I claim, in burglar-proof structures composed of more than one layer of plates, employing plates composed of soft iron joined with plates containing hardened steel by means of rivets, C, or their equivalents, arranged relatively to each other and to the several plates, substantially in the manner and for the purpose herein set forth.

65,056.—STEAM ENGINE.—Caleb Cadwell, Waukegan, Ill.

First, The double-piston cylinder, L, without heads, and having the valve, 6, constructed and arranged with reference thereto, substantially as described.

Second, The pump valve, 2, having the shaft, Q, attached and operated, as described and set forth.

65,057.—CHALK-LINE MARKER.—John W. Carter, New York City.

I claim the use or employment of the spindle and cord when the same shall be constructed and combined, substantially as shown, for the purpose indicated.

65,058.—CURTAIN FIXTURE.—Marvin Converse, Jordan, N. Y.

I claim the sliding frame, C, carrying the curtain roller and journals, moving freely upon the edge of the window frame on the guide rod, B, in combination with the cords, A E' and D', for raising and lowering the curtain, substantially as described.

65,059.—HARVESTER RAKE.—F. E. Cook, Seville, Ohio.

First, I claim the pivoted curved bar, B, sleeve, L, and rake, K, in combination with the rod, M, and cam, E, as and for the purpose set forth.

Second, The notched wheel, F, springs, I and J, in combination with the bar, B, and rake, as and for the purpose described.

Third, The nut and screw, with lug, in combination with the sleeve, L, and bar, B, so as to allow the rake to fall back in place in the spaces, a, before it is drawn across the platform in discharging the gaven, as and for the purpose specified.

65,060.—BENCH HOOK OR DOG.—Charles T. Crane, Lowell, Mass. Antedated May 19, 1867.

I claim a bench hook consisting of a frame, a, socket, b, for the sliding spindle, d, with hook, e, attached, and spring, f, all as mechanically arranged for the purpose herein described, and the manner fully set forth.

65,061.—BED BOTTOM.—Charles Croley, Dayton, Ohio.

I claim the construction of the supporting pieces, a and b, with slotted ends, substantially as and for the purpose specified.

65,062.—SHUTTLE FOR SEWING MACHINES.—Job A. Davis, Watertown, N. Y.

I claim the lever pad, s, screw, w, and coil spring, c, when constructed and arranged, substantially as and for the purpose set forth.

65,063.—COMPOUND FOR REFINING CIDER, ALE, etc.—Wm. M. Davis (assignor to himself and Wm. L. Beckwith), Cleveland, Ohio.

I claim the composition above described, compounded of the ingredients above mentioned, or their known equivalents, substantially as and for the purpose set forth.

65,064.—ROCK DRILL.—Daniel S. Early, Hummelstown, Pa.

First, I claim the drill rod, constructed with the fixed collar, K, and shoulder, L, in combination with the tappets, G, and slotted crosshead, H, substantially as described for the purpose specified.

Second, The tappets, G, with shoulders, g, and turned ends, h, arranged with the slotted crosshead, H, in combination with the drill rod, I, having fixed collar, K, and square shoulder, L, substantially as described for the purposes specified.

65,065.—APPARATUS FOR EVAPORATING LIQUID.—Lewis C. England, Philadelphia, Pa.

First, I claim a stirrer composed of main shaft, L L', teeth, D D, upright, U S, combined with evaporator, B P, by means of journals, O, capable of a rocking motion, constructed substantially as described.

Second, The combination of frame, o o, tapering frame, o' o', and crank screw, S S C, working together in the manner and for the purpose described.

Third, Box, B P, false metallic bottom, de de, frames, o o o' o', crank screw S S C, and stirrer, L L', all combined and working together in the manner above described and for the purpose set forth.

65,066.—PIPE CUTTER.—Theodore S. Foster (assignor to himself and John P. Sabin), Fitchburgh, Mass.

First, I claim the knife, b, constructed as described and attached to the claw, substantially in the manner and for the purpose above specified.

Second, The combination of the knife, b, with the friction rollers or their equivalent, and the feeding screw as above described.

65,067.—CURTAIN FIXTURE.—Charles H. Fowler, West Roxbury, Mass.

I claim the combination with a curtain roller of a sliding or spring box or clamp, under such an arrangement that the said box or clamp shall not only constitute the means by which the roller and curtain are held in position, but also support the journal of the said roller at all times and form the bearing in which it resolves as herein set forth.

I also claim the combination of the journal of a curtain roller with the recessed bracket and sliding or spring bearing substantially in the manner and for the purposes herein specified.

65,068.—SHAFT TUG.—Kasson Frazer, Syracuse, N. Y.

I claim as new article of manufacture a shaft tug composed of the parts, A B C, substantially as and for the purposes described.

65,069.—BRICK PRESS.—E. R. Gard, Chicago, Ill.

First, I claim a follower, S, provided with one or more rollers, u u, running under and in combination with flanges, f f, projecting from the track nearly along its entire length, substantially as and for the purposes herein specified.

Second, I also claim the removable journals, V V, for the supporting roller, U, of each follower, the said bearings being provided with oil cavities for containing oil and some porous, or capillary substance, to keep the journals constantly lubricated, substantially as herein set forth.

Third, I also claim an adjustable top or lid, X, for the followers, by means of the washers, x x, or any equivalent thereof, for the purposes herein described.

Fourth, I also claim the combination of the projecting rim, b, of the mold wheel, and the supporting roller, L, for the purpose set forth.

Fifth, I also claim the self-lubricating journal box of the roller, L, constructed substantially as herein specified.

Sixth, I also claim the adjustable pressure portion, G, of the track when combined with india-rubber, or equivalent, springs, H H, substantially as and for the purpose specified.

65,070.—MODE OF FORMING THE EDGE OF WATER-PROOF SOLES.—Joseph H. Greenleaf, New Haven, Conn.

I claim the leather edge for soles constructed and formed substantially as herein set forth, as a new article of manufacture.

65,071.—APPARATUS FOR FORMING EDGE OF WATER-PROOF SOLES.—Joseph H. Greenleaf, New Haven, Conn.

I claim the apparatus substantially as herein described for forming the edge of soles.

65,072.—CHAIR AND BEDSTEAD.—Joseph Greenleaf (assignor to himself and O. F. Case), New Haven, Conn.

I claim the combined chair and bedstead herein described having the seat, H, and back, G, attached thereto, and so as to be folded, the seat, H, down toward the back, and the back, G, backward down on the frame, substantially as herein set forth.

65,073.—CORN PLANTER AND FERTILIZER COMBINED.—Benjamin F. Grimes, Dawsonsville, Md.

First, I claim the arrangement of the corn hoppers, C C, fertilizer hoppers, D D, discharge tubes, E E, and inclined tubes, F F, substantially as and for the purpose herein set forth,

Second, The combination of the bar, G, hinged arms, H H, levers, I I, slides, J J, and dropping slides, N N N' N', substantially as herein described.

Third, The combination of the bar, P, levers, P' P', rods, Q' Q', bar, P2, and valves, Q Q Q2 Q2, all arranged and operating substantially as herein described.

Fourth, The combination with the bar, G, and its described connections with the dropping mechanism of the lever, R, arranged and employed in the manner and for the purpose explained.

Fifth, The combination of the rack shaft, T, arms, T1 T2, tappet or projections, b, notch post, U, and spring catch, V, arranged and operating in connection with the dropping mechanism, as and for the purpose specified.

Sixth, The stirring shafts, O O o2, in combination with the levers, I I, links, o o, and lugs, o' o' as described.

Seventh, The discharge tube, E, when made in two or more parts and hinged in order to adapt the lower section to be turned up and held in its raised position, substantially as described.

Eighth, The arrangement within the discharge tubes of the deflecting pieces or plates, a, substantially as and for the purpose set forth.

Ninth, The weights, G' G' in combination with the bar, G, as and for the purpose explained.

Tenth, The frames, h h, carrying the shovels, h', and coverers, h2 h2, in combination with the supporting bar, A, slotted pendants, A4 A4, and adjusting pins, a4, all arranged and operating in the manner and for the purpose explained.

Eleventh, The combination with the dropping slide of the fertilizer hopper, D, of the flap valve, d, and ball or weight, e, applied and operating in the manner and for the purpose specified.

65,074.—GRAIN CLEANER.—J. A. Hall, Greenfield, Ind.

First, I claim the shaking shoe, C, hinged to the frame and agitated by contact with the circular series of cams or projections on the head of the rotating screw, substantially as described.

Second, The rotating screw, G, in combination with the shaking shoe, C, and the shutter, P, for regulating the discharge, substantially as described.

65,075.—STEAM COCK.—Albert Hallowell (assignor to himself and Horace R. Barker), Lowell, Mass.

I claim the combination as well as the arrangement of the spring, s, or the same and either or both the chambers, n P, with the auxiliary conical valve, e, and seat, f, the cap, F, the hand wheel, I, and the key, E, employed for effecting by aid of the screw, c d, the vertical movements of the main valve, A, with respect to its seat, B, as described.

65,076.—WASHING MACHINE.—William H. Hanson, Albion, N. Y.

First, I claim the rotary brush, E, one or more rollers, I, and the screw, K, in combination with the corrugated board, H, operating in the manner and for the purpose shown and described.

Second, I claim in combination with the above the roller, L, and the box, A, having two compartments, C and D, substantially as shown and described.

65,077.—MACHINE FOR CUTTING HAIR, GRASS, ETC.—C. F. Harlow, Boston, Mass., and E. H. Perry, Roxbury, Mass.

First, We claim so combining, arranging and operating the two sectoral plates, A B, as to be enabled when desirable, to operate them by one hand, essentially as described.

Second, We claim combining the two plates, A B, and their operative mechanism in such manner as to obtain a number of reciprocating movements of the said cutter plate, B, over the plate, A, to one movement of the handles, h h' or the lever, F, substantially in the manner as set forth and explained.

Third, We claim the mechanical construction of the machine substantially as above described, that is the combination of the two plates, A B, bar, D, lever, F, provided with the handles, h h' rack and pinion, e and d, and cam groove, k, in manner and to operate as specified.

Fourth, We also claim the peculiar devices for operating the cutter plate, B, consisting of the rack, e, applied to the lever, F, the pinion, d, and the disk, b', with its cam groove, k, operating in connection with a stud, upon the cutter plate, substantially in manner and to operate as described.

Fifth, We claim the employment of the friction roller, i, for the purpose of keeping the two plates, A B, in contact, and relieving the friction between the latter and the bar, D, substantially as set forth.

65,078.—INDICATING APPARATUS FOR OIL AND OTHER STILLS.—Walter Hart, Philadelphia, Pa.

What I claim is an apparatus substantially such as described, which when applied to a still or other evaporating vessel, will show externally the quantity, specific gravity, temperature, pressure, color and rate of evaporation of the contents of the still, by means of passages and indicators, substantially as described.

65,079.—CAR COUPLING.—Andrew Hartman, Canton, Ohio.

First, I claim the peculiarly shaped apron or balance, D, of the pin, E Z D, so arranged and constructed as to act both as a balance, and a part of the mouth of the coupling, substantially in the manner and for the purpose herein specified.

Second, The peculiar combination and arrangement of the parts, A and B, rotating pins, E Z D, bolt, H, block, J, spring, L, iron, K, pins, O O, slots, S S, catch, C, with handle, I, the several parts being arranged as hereinbefore shown, and the whole forming a self-acting coupling operating substantially in the manner specified.

65,080.—MACHINE FOR JOINTING STAVES.—George R. Hay (assignor to himself and J. R. Seely), Edgerton, Ohio.

First, I claim the link, e, rod d, spring, c, pin, N', and clamps, O O', in combination with the vibrating frame, substantially as and for the purpose set forth.

Second, The adjustable vibrating frame provided with the devices for curving and holding the stave, and detaching said stave when finished, constructed and operating substantially as described.

65,081.—VISE.—John S. Hoar (assignor to himself and C. Hastings and N. C. Cutter), West Acton, Mass.

I claim the combination of the vise with a table or other support by means of the plates, A and B, axial pin, e, bolts, c, and nuts, d' all constructed and arranged substantially as described.

I also claim in combination with the jaws, C and D, the anvil, G', attached to the jaw, C, and arranged in relation thereto as described.

65,082.—STEAM WATER ELEVATOR.—W. L. Horne, Batavia, Ills.

I claim a water elevator consisting of the exterior cylinders a, and interior valve cylinder, b, and valve c, operated in the one direction by steam and in the other direction by water combined and arranged as set forth.

65,083.—DOOR STOP.—G. W. Hunt (assignor to J. S. Gray and J. S. Watson), Winchendon, Mass.

I claim a combined metallic and elastic door constructed and operating substantially in the manner herein described for the purposes set forth.

65,084.—COMPOUND FOR SILVER PLATING.—E. Hunter, M. D., Cleveland, Ohio.

I claim the herein described compound for cleaning silver ware and cleaning and re-plating plated ware, or ware made of copper or any of its alloys, or any other metals or alloys.

65,085.—MOSQUITO BAR.—John S. Hunter, Hartford, Conn.

I claim the arrangement of the bows, B, more or less in number and combined with an adjustable socket, C, so as to be attached to the bedstead and to operate substantially as set forth.

65,086.—BLIND FASTENING.—S. W. Huntington, Augusta, Me.

I claim the combination with the catch bar as described of the socket formed in two parts with a chamber for receiving the head of the catch bar and for allowing slight vertical movements of the same, substantially as and for the purposes herein shown and set forth.

65,087.—GANG PLOW.—Joseph and James Ingham, San Jose, Cal.

We claim, First, The movable pivoted bars, C C' with the segments, D D' wheels, E E' and pinions, F F', to raise and lower the plows, substantially as described.

Second, The two part axle, G with the vertical connecting necks, K K' to make the plows cut to an equal depth as described.

Third, The eyes, L L' together with the bar, M, and screw, m, for the purpose of regulating the draft, substantially as described.

65,088.—MELODEONS, ETC.—S. A. Jewett, Cleveland, Ohio.

I claim the tappets or independent manuals, K, rods, J, levers, G, and rods, H, in combination with the keys, A, and reeds, C, in the manner and for the purpose set forth.

65,089.—TURNING LATHE.—William Johnson, Lambertville, N. J.

I claim, First, The continuous cover, M, over the feed screw, G, said cover passing through an aperture in the slide rest and in other respects arranged as set forth.

Second, Constructing the feed nuts to allow the cover to pass between them and the peculiar arrangement of eccentric movable arm and connecting bars, whereby the feed nuts are made to move equal distances in opening and closing the feed screw by rods attached to said nuts at points unequally distant from their center of motion. The whole combined and operating substantially as herein set forth and described.

65,090.—PUNCH FOR CAR TICKETS, ETC.—R. J. Kellett, San Francisco, Cal.

I claim a punch with an attachment, E, or its equivalent for holding the clippings or chips of tickets in the manner substantially as and for the purpose specified.

65,091.—ELASTIC BUTTON FOR CARRIAGES.—Theodore E. King, Painesville, Ohio.

First, The adjusting screw C, in combination with the rubber collar D', arranged in relation to the curtains, in the manner and for the purpose substantially as set forth.

Second, The rubber collar D,' and adjusting screw C, as arranged in combination with the button hole E, and curtains in the manner as described.

65,092.—COMPOUND FOR PREVENTING INCRUSTATION IN STEAM BOILERS.—H. Frederick Knoderer, Sr., and L. F. Knoderer, Columbus, Ohio.

We claim the application of a compound or preparation of two parts of common alum and one part of common glue prepared and applied as above specified to prevent and remove the accumulations and incrustations of steam boilers and the pipes and tubes belonging thereto as hereinbefore specified and substantially set forth.

65,093.—RUDDER.—F. W. Kuhnert, Rochester, N. Y.

I claim the combination with the main rudder B, of the series of auxiliary rudders E E E, arranged in the keel one after another and capable of being connected with and disconnected from the main rudder, in action, as herein set forth.

65,094.—GANG PLOW.—L. B. Lathrop, San Jose, Cal.

First, I claim the rotary cutters d, attached to the wheels C, and forming flanges thereon, for the purpose of acting as land sides for the plows, substantially as set forth.

Second, The axle B, when arranged obliquely below the tongue A, and when adjustable by means of the screw bolt a, and slotted arm b, substantially as and for the purpose herein shown and described.

Third, The devices for raising and lowering the plows, consisting of the screw K, rods I and h, and of the axle B, lugs f and g, bar F, and bolts e, respectively, as set forth.

Fourth, The double tongue A M, in combination with the wheel I, supporting the end of the main tongue, and with the hinges l m n and o p s, substantially as herein shown and described.

Fifth, The plow beams E, when bent so as to form off-sets at the top of the mold-boards, substantially as and for the purpose herein shown and described.

65,095.—TOCACCO CUTTER.—Nehemiah W. Lee, North Providence, R. I.

I claim the knife D, with its rack b, sliding vertically in the frame B, and operated against the resistance of springs E, or their equivalents by the lever G, with its movable fulcrum and toothed sector F, substantially as described for the purpose set forth.

65,096.—TRACE FASTENING.—Burdette A. Lewis, New Britain, Conn., assignor to himself and Jeremy W. Bliss, Hartford, Conn. Antedated May 16, 1867.

I claim the projection e, upon the button e in combination with the latch C, and protuberances h, substantially as and for the purpose described.

65,097.—VISE.—Joseph H. Lewis, Duxbury, Mass.

First, I claim the arrangement and combination of the movable law e, and internal threaded rotating screw i, with the stationary support and jaw a, and fixed external threaded screw, g, substantially as described.

Second, I also claim the arched slide d, in combination with the support a, of the stationary jaw substantially as and for the purposes set forth.

65,098.—BOLSTER FOR RAIL ROAD CAR.—John Marquis and John W. Kimmell, Crestline, Ohio.

First, We claim the clamping pieces F F, constructed in the manner and for the purpose herein specified.

Second, The combination of the rods O O, with nuts g g g g, thereon and the clamping pieces F F, in the manner and for the purpose specified.

Third, The arrangement and combination of the clamping pieces F F, and rods O O, as claimed in second claim with the pieces A B and C, and connecting pieces D D, the whole forming an adjustable bolster in the manner and for the purpose herein specified.

65,099.—CERTRIFUGAL PUMP.—Carlo Federici Martorana, Baltimore, Md.

First, The pump consisting of the wheel W, constructed as described and arranged to operate as and for the purpose herein set forth.

Second, I claim the arrangement of the pump wheel W, and tube or case T, with the valves d, in the bottom of a floating platform or vessel substantially as and for the purpose set forth.

65,100.—MACHINE FOR MAKING SCREWS.—Benjamin A. Mason, New York City.

First, I claim the series of intermittently revolving jaws, in combination with the revolving shaft s3, cutter 15, and cone t1, constructed, arranged and acting substantially as specified.

Second, I claim the hanging saw u, actuated in the manner and by the means substantially as described in combination with the blank holders o' for the purposes and as set forth.

Third, I claim the pointing tool secured upon the end of the revolving spindle v' in combination with the lever 23 cam 24, and blank holders o' as and for the purposes set forth.

Fourth, I claim the arrangement and combination of all the mechanism herein described for shaving nicking and pointing screw blanks as set forth.

65,101.—BRIDLE.—J. Franklin Mason, Bentonsport, Iowa.

I claim the rounded strap, in combination with guards and rings, to be secured to the horse's under jaw in the manner and for the purpose herein described.

65,102.—COTTON BALE TIE.—Matthew F. Maury, New Orleans, La.

I claim the plate A, when provided with the folding flanges a a1, and shoulders b b1, as described for the purpose set forth.

65,103.—BREECH LOADING FIRE ARMS.—Reuben McChesney, Utica, N. Y.

First, I claim sustaining the forward extension of the breech piece upon a vibrating fulcrum piece a, substantially as described.

Second, The combination of the breech piece D, fulcrum piece a, and latch d, operating substantially in the manner set forth.

Third, Constructing the fulcrum piece a, so as to receive through it the spring a', which depresses the breech piece when the latter is released from the latch d, substantially as described.

Fourth, The arrangement of the cartridge shell extractor 11', so as to be operated upon with the full force of the spring a', through the agency of the intermediate slotted device n n' and the breech piece D D, the said parts being thrown into action by the act of cocking the arm substantially as described.

Fifth, Constructing the hammer G, with a flange g' for entering a recess g2 formed in the breech piece and assisting in holding the latter firmly in place, substantially as described.

Sixth, Constructing the latch d, of the breech piece so as to receive the forward end of the main spring J, through it, said latch d, being pivoted upon the trigger pin e', substantially as described.

Seventh, Applying the pin i, to the breech holding latch and operating said pin by the projection g, on the inside face of the hammer G, substantially in the manner shown and described.

65,104.—HINGING LID OF TEA KETTLE.—William L. McDowell, Philadelphia, Pa.

I claim a wide mouthed tea kettle having a hinged lid attached consisting of the two segments D, E, coupled together and applied so as to operate substantially as described and for the purposes specified.

65,105.—BAG HOLDER.—James Melcher, Minneapolis, Minn.

First, I claim constructing the lower part of hopper I, with an hinged side, and connecting said side to the opposite side of the hopper by means of a flexible material in order that it may accommodate itself to the mouth of the bag substantially as set forth.

Second, In combination with the hinged side and flexible material, I claim spring M, for the purpose of retaining the mouth of the bag open to its greatest extent, substantially as described.

65,106.—HARVESTER RAKE.—Lewis Miller, Akron, Ohio.

I claim in combination with a revolving arm carrying a pivoted rake or fork upon its outer end a slide and connecting rod, that is operated by a cam and guide, and attached to said rake or fork so that while the arm moves in a true circle the rake or fork may assume different positions upon it, substantially as and for the purpose described.

65,107.—SNAP HOOK.—Charles E. Mitchell, New Britain, Conn.

I claim a rigid pressure attachment E, or its equivalent, acting against the heel of the latch, to firmly close it with the hook, substantially as and for the purpose described.

65,108.—MANUFACTURE OF ALCHOLIC SPIRITS.—J. Neely and Simeon Allen, Buckingham County, Va.

First, We claim the manufacture of spirituous liquors and alcohol from the juice of maize or Indian corn, substantially as herein set forth.

Secondly, We claim as a new article of manufacture spirituous liquors or alchohol made from the expressed juice of corn stalks.

65,109.—CAR WHEEL.—D. P. Nickerson, Cleveland, Ohio.

First, I claim the shell A, elastic ring F, and disk I, provided with the shoulder or flange C, in combination with the elastic rings H.

Second, The clutches L E, and disk in combination with the elastic rings and shell A, substantially as and for the purpose set forth.

Third, The annular shoulders D M' rings H, plate M and shell A, arranged substantially as and for the purpose set forth.

65,110.—FURNACE FOR HEATING AND WELDING.—George Nimmo, Jersey City, N. J.

I claim the welding and heating furnace formed with the heating chamber b, fire and and welding chamber a, and openings d e e and f, in the manner and for the purposes set forth.

65,111.—PIPE WRENCH.—J. L. Ordner, Cleveland, Ohio.

I claim hook F, and pivoted nut E, as arranged and operating within and in combination with the slotted shank B, as and for the purpose set forth.

65,112.—SECTIONAL TAKE UP FOR CORSET LOOMS.—Solomon Ottenheimer, New York City.

I claim the springs o, applied between the stationary shaft c, and the toothed ring b, in combination with the wheels d, of the sectional take up roller of a loom for weaving corsets and other irregular fabrics substantially as set forth.

65,113.—HORSE RAKE AND HAY SPREADER.—George N. Palmer, Green, N. Y.

First, I claim the arrangement and combination of the balanced frame B, B, short levers F F, and the rake head E, in the manner herein described for the purposes set forth.

Second, I claim regulating and adjusting the tilting motion of the frame B, by the screw hooks k k, and springs m m, as described.

Third, I claim the combination of the pawls e e, ratchets b b, and thumb screws c c, constructed and arranged substantially as and for the purposes specified.

65,114.—VISE.—B. F. Perkins, North Adams, Mass.

I claim the spring B, or its equivalent in combination with the screw D, and lever C, as herein described, and for the purpose specified.

65,115.—COUNTER AND DESK SEAT.—W. R. Pomeroy, Millersburg, Ohio.

I claim the bracket B, seat C, lugs D, and springs I, as arranged in combination with the counter A, for the purpose and in the manner as set forth.

65,116.—BALANCE WHEEL OF WATCHES.—George Ramsay, Clyde, Ohio.

First, I claim a watch balance wheel constructed with spring arms as and for the purpose set forth.

Second, The balance wheel with spring arms in combination with the guards, substantially as and for the purpose set forth.

65,117.—SHANK LASTER.—L. Rastetter and A. Simcox, Fort Wayne, Ind.—Antedated May, 16, 1867.

We claim the shank A, handle B, stationary jaw C, movable jaw E, spring J, adjustable fulcrum D, combined, and operated as described and constructed in the manner and for the purpose specified and set forth.

65,118.—FASTENING SEATS TO CARRIAGES.—Martin C. Remington, Auburn, N. Y.

First, I claim the device for fastening seats to carriages and constructed substantially as described.

Second, The eccentric C, and sliding hook E, substantially as described for the purpose specified.

Third, The locking device consisting of the spring toothed lever D, toothed ring F, of the hook E, in combination with the eccentric C, substantially as described.

65,119.—SHIFTING RAIL FOR CARRIAGE TOPS.—Uel Reynolds, New York City.

I claim the wooden shifting rail to which the metal slat irons and prop blocks are attached as set forth.

65,120.—BOOTS AND SHOES.—E. P. Richardson, Lawrence, Mass. Antedated May 16, 1867.

I claim the system or mode of fastening the soles of boots and shoes, by means of barbed or corrugated nails or pegs, either with or without heads and driven either from the outside or inside of the boot or shoe, substantially as herein set forth, and for the purpose specified.

65,121.—SAND PUMP.—E. A. L. Roberts, Titusville, Pa.

First, I claim the combination substantially as and for the purposes herein set forth and described, of a tube piston and foot valve, the latter being opened for the purpose of discharging the contents of the pump by means of the stem k, or its equivalent whether attached to, or separate from the valves.

Second, The perforations s, as arranged in relation to said pump for the purposes herein set forth.

65,122.—PROCESS OF REDUCING AND REFINING METALLIC ORES AND OXIDES.—S. C. Salisbury, New York City.

First, I claim the application and use in blast and other like furnaces for reducing metallic oxides, of a blast of hydrogen and oxygen gases, or their equivalent when heated to a temperature of from 700° to 800°, Fahrenheit, or thereabouts for the purposes set forth.

Second, The use in such furnaces in combination with such blast of hydrogen and oxygen gases or their equivalent heated as described, of carbon gas, when free from or obtained from hydrocarbons free from sulphur, phosphorus, ammonia, etc., for the purposes set forth.

Third, The use in such furnaces of such blast of hydrogen and oxygen gases or their equivalent, so heated as described, and of such carbon gas free from sulphur, phosphorus, ammonia, etc., in combination with the ordinary air blast, for the purposes set forth.

Fourth, In combination with blast and other furnaces used for reducing ores, the use of a compound or divided tweer constructed substantially as described, for supplying to such furnaces such blasts of different character, substantially as and for the purposes sent forth.

Fifth, The use in blast and other furnaces used for reducing ores of manganese, substantially as and for the purposes set forth.

65,123.—CUTLERY.—Henry Sanderson, Sheffield, Eng., assignor to Wm. Sanderson, New York City.

I claim uniting the handle and blade in the manner substantially as herein described.

65,124.—PIPE VISES.—D. Saunders, Brooklyn, N. Y.

I claim the improved pipe vise herein described turning on the axis, C, and having the side opening, H, to allow the introduction and removal of the work, the several parts being combined and arranged substantially as and for the purpose herein set forth.

65,125.—STRAW CUTTER.—W. D. Schooley, Richmond, Ind.

First, I claim the arrangement of the balance wheel, B, and main shaft, C, relative to the main frame, and knife sash, E, substantially as described and for the purposes set forth.

Second, The use of the lever, k, when provided with the adjustable head, l, and operated by the cam, D, and to operate in combination with the rods, m m, and levers, J J, for the purposes specified.

Third, The adjustable bearings, O, as described and set forth.

Fourth, The keys, u u, for adjusting the knife frame, as shown and described.

Fifth, The guard, w, when made detachable, substantially as described and set forth.

65,126.—OIL CUP.—H. K. Sears and S. L. Holt, Hartford, Ct.

We claim the combination of the passage, a, valve, d, guide, i, and rod, e, all arranged to operate substantially as and for the purpose described.

65,127.—REGISTER POINTS FOR PRINTING APPARATUS.—John F. Shearman, Brooklyn, N. Y., assignor to E. S. Dodge & Co., New York City.

First, I claim the case, K, inclosing the point, I, and open on one side to allow the operation of the edge of the blade, G', or its equivalent, so as to operate the point therein in any position in the slot, substantially in the manner and for the purposes herein set forth.

Second, I claim in combination with the above, the clamp, L, and adjusting means, N, or its equivalent, adapted to be conveniently operated from above the feed board, so as to set the point in the desired position in the slot, c, substantially as herein specified.

Third, I claim adjusting the turning plate, C, by operating from the upper side, all substantially in the manner and for the purposes herein set forth.

65,128.—PLANING MACHINE FOR WOOD.—P. T. Smith. Salem, Ohio.

First, I claim the adaptable shaft, G, dowel points or clutch, c', socket joint, a, in combination with the feed rollers, E F, and springs, K, as and for the purpose substantially as set forth.

Second, The vertical revolving cutters, Q, spring guides, d', and f, as arranged in combination with the saw, g, for the purpose and in the manner described.

65,129.—KETTLE.—Alfred Sower, New York City.

I claim the chamber, E, in combination with the tubes, C, and pipes, F G, substantially as herein shown and described for the purpose specified.

65,130.—SHEEP SHEARER.—I. H. Spelman, Baconsburg, Ohio.

I claim the combination of a shearer for the purpose and in the manner as substantially described, as a new article of manufacture.

65,131.—CARD ON LABEL HOLDER.—Edward F. Stephens, Towanda, Pa.

I claim the form of the plate as cut of one piece of metal, the points marked C D E and F, which secure the holder to the drawer, or so forth, without the use of nails or other means of fastening, and the flanges, G H and I, so turned as to hold the card or label and permit the same to be changed without detaching the holder.

65,132.—MACHINE FOR MAKING FERRULES.—Jeremiah Stever and John A. Way, Bristol, Conn.

First, We claim the reciprocating bending dies, J J, slides, L L, and mandrel, R, combined and arranged for joint action, substantially in the manner described.

Second, We claim in combination with the above the presser, R'', substantially as and for the purpose described.

65,133.—GRINDING MILL.—Isaac Straub, Kenton County, Ky.

I claim the bolt, b, when used in combination with trambolts, a a a a, for the purposes substantially as described.

65,134.—MANGLE.—R. A. Stratton, Philadelphia, Pa.

First, I claim the combination of the rollers, E E' secured to the adjustable spring standards, D D', and the roller, F, secured to the spring standard, D', the whole being constructed and arranged as and for the purpose set forth.

Second, the shield, m, arranged in respect to the rollers as and for the purpose described.

65,135.—PNEUMATIC SPRING.—D. B. Strope, Fort Wayne, Ind.

First, I claim the construction and arrangement of the hollow piston in its relation to the oil contained in the reservoir or outer cylinder, in the manner and for the purpose herein described.

Second, I claim the combination of the packing, D, elastic packing, I, metallic packing ring, E, and elastic flange or packing, F, with the gland, C, and piston, B.

Third, I claim the combination of the studs, K, cylinder, A, and piston, B, substantially as shown and described.

Fourth, I claim the combination of the cock, G, valve, M, and cylinder, A, when arranged substantially as shown and described.

65,136.—OIL STILL.—Dexter Symonds, Lowell, Mass., assignor to himself, Benj. Woodward, and M. S. Marshal.

I claim in stills for deodorizing and purifying oils, where the substance or material used and the process of deodorizing and purifying are herein described.

I claim the employment of one or more screens in the manner and for the purpose substantially as set forth.

And I also claim the employment of a screen or screens in any still where the substance or material under operation is liable to foam or rise, as set forth.

65,137.—MODE OF PURIFYING AND DEODORIZING OIL.—Dexter Symonds, Lowell, Mass., assignor to himself, Benj. Woodward, and M. S. Marshal.

I claim in deodorizing and purifying hydro-carbon or other oils, the use of the substances or materials herein specified and in the manner set forth.

65,138.—MACHINE FOR CUTTING SHEET OR BAR METAL.—Timothy F. Taft, Shrewsbury, Mass, assignor to Augustus Rice, Worcester, Mass.

I claim the application to the lock shears above described of the two arms, J J, with bolt, K, and nut, L, or their equivalents, substantially as described.

65,139.—COMPOSITION FOR CLEANING METALS, WOOD, AND OTHER ARTICLES.—C. S. Toms, Utica, N. Y.

I claim the composition of matter substantially as herein described, with and without the Fullers earth.

65,140.—GATE FOR WATER WHEELS.—Garret Vliet, Milwaukee, Wis., assignor to Wm. Vliet, Green Lake Co., Wis.

I claim solid metal gate, C, with water ports through its metallic water guides, D, projecting through the ports in gate, C, and curved at their inner ends to conform to the shape of the wheel, for the purpose of giving the water the proper direction, metal rings, E and F, bolts, G, and pinion, H, all arranged and combined substantially as and for the purpose described.

65,141.—TUCK MARKER OR CREASER FOR SEWING MACHINES.—Anna Weissenborn, New York City.

First, I claim the combination of a creasing or marking wheel or roller, A10, sliding in unison with a sliding blade, A12, when applied to a sewing machine, in such a manner that the creasing or marking can be done during the process of sewing, substantially as described.

Second, I claim also for giving the downward pressure of the creasing wheel against an edged or grooved instrument attached to the sliding blade, A12, the employment of a spring or set screw or a lever, substantially the same as set forth.

65,142.—COMBINED MATCH BOX AND TAPER HOLDER.—John A. Whipple, Cambridge, Mass.

I claim the combination of the casing, A, the match holder, B, and hinged socket, S, substantially as and for the purpose specified.

65,143.—PUNCHING PRESS.—M. G. Wilder, West Meriden, Ct.

First, I claim the combination of the eccentric, G, stock, A, shaft, B, lever, E, arranged and operating substantially as described.

Second, I claim the combination of the eccentric, G, stock, A, shaft, D, levers, E K, arm, L, with the wheel, H J, substantially as and for the purpose described.

65,144.—HORSESHOE.—Albert S. Wilkinson, Pawtucket, R. I.

First, I claim an elastic or spring connection, L, for connecting the heels of expanding shoes, substantially in the manner and for the purpose set forth.

Second, In a jointed horseshoe as described, and having a continuous clip, I claim the toe clip, a, and heel clips, e e, provided with the projecting arms, e2 e2, in combination with the elastic spring connection, L, substantially as described.

65,145.—HORSESHOE.—Albert S. Wilkinson, Pawtucket, R. I.

First, I claim in double shoes an expansion joint which consists in slitting the upper and lower plates laterally so as to break joints, so that the toe clip acts as a spring joint to allow the heels of the shoe to expand laterally, substantially in the manner and for the purpose set forth.

Second, I claim the double shoe, A a, having an expansion joint as described, in combination with the toe clip, B, provided with a loop, c, and retaining bands, f f, substantially as described.

Third, I claim the double shoe, A a, having an expansion joint as described, in combination with the toe clip, B, provided with a loop, c, retaining bands, f f, and heel rests, j j, the whole being constructed and operating substantially in the manner and for the purpose set forth.

65,146.—SASH TIGHTENER.—J. D. Winslow, Wilmington, Del.

I claim attaching to window sashes the wedge-shaped piece, a, together with the pin or stop, b, as shown in the drawings and herein described, as a sash tightener to exclude wind and storms and prevent the sash from rattling.

65,147.—APPARATUS FOR DISTILLING TURPENTINE.—J. E. Winants and J. F. Griffen, New York City.

We claim melting the lower portion of the mass of crude material in the bottom of the supply tank or hopper, and there partially straning it, substantially in the manner described and for the purposes set forth.

We also claim the employment within a closed chamber, D, of a steam-heated strainer, F, constructed and operating substantially as described for the purpose set forth.

We also claim the employment in combination with the chamber, D, and steam-heated strainer, F, of one or more auxiliary sieves or strainers, substantially as described.

We also claim the employment, in combination with a strainer confined within a chamber of a cleaning device or scraper arranged to be operated from the outside of the chamber, substantially as described.

We also claim making the strainer chamber, D, with windows, as and for the purposes specified.

We also claim the employment within a closed vessel, K, of one or more steam-heated disks or evaporators, when formed with a scroll-shaped or helical groove in the passage of the liquid, substantially as described for the purpose set forth.

We also claim forming the still with windows substantially as described for the purposes set forth.

We also claim supplying the superheated steam directly to the evaporators, carrying it thence to the steam strainer, and lastly to the melting worm, so as to heat these several devices to different temperatures, as hereinbefore described for the purposes set forth.

We also claim the combination or combined arrangement of the supply hopper, melting coil, strainer, and still with the heating medium, when operating together in substantially the manner hereinbefore described for the purposes set forth.

65,148.—CLOTHES WRINGER.—Geo. L. Witsil (assignor to himself and Wm. Darnon and Geo. W. Griffin), Philadelphia, Pa.

First, I claim the combination of the roller, A, spur wheel, G, and frame, F, including the jaws, F2 F3, and the roller, A1, adjustable pinion, G1, and frame, D, including the jaws, D3 D4, said parts being respectively constructed and the whole arranged to operate substantially as and for the purpose set forth.

Second the arrangement of the rollers at A and A1, when both are actuated positively, frames, D and F, including the jaws, F2 F3 and D3 D4, block, D1, stems, D2, and spiral springs, E, substantially as set forth.

Third, In combination with the rollers, A and A1, the spur wheel, G, and slotted pinion, G1, cross piece, H, rigidly attached to the shaft of the upper roller and washer, I, substantially as and for the purpose set forth.

65,149.—GRAIN CONVEYING MACHINE.—S. W. Wood, Cornwall, N. Y.

I claim a reservoir, B, and weighing apparatus or scales, H, in combination with the receiving and conveying pipes or passages, C D, air pump, A, and the governing valves constructed and arranged to operate substantially as and for the purposes herein specified.

I also claim the perforated partition or screen, L, in combination with the reservoir, B, receiving and conveying pipes, C D, air pump, A, and valves, substantially as and for the purpose herein set forth.

I also claim the devices, or their equivalents, for the introduction of air into the receiving and conveying pipes, C D, in addition to that introduced with the grain, substantially as and for the purpose specified.

I also claim the arrangement of the devices, or the equivalent thereof, for introducing grain into a conveying pipe of passage, substantially as shown in figs. 3 and 4, and for the purpose herein specified.

65,150.—PROP FOR CARRIAGE TOPS.—Charles R. Abbott, Elmira, N. Y.

1st, I claim the shank, B B', when made in two parts, and constructed and operating substantially as and for the purposes set forth.

2d, The shank, B B', in combination with plate, A, ferrule, C, and screw, D, substantially as and for the purposes set forth.

3d, Securing the shank, B B', and ferrule, C, together, by means of tongue and groove, o, and pins and holes, v, substantially as and for the purposes set forth.

65,151.—CAR COUPLING.—John D. Anderson, Corry, Pa.

I claim the construction and arrangement of the link, B, fitting over the hooks, C, upon the upper side of the draw heads, said link catching over the pins, g, and prevented from slipping when in a vertical position by means of the circular projections, h, and coupled by means of the bent arm, d, striking the projection, a, upon the draw heads, as herein shown and described.

65,152.—CLOTHES-DRYER ATTACHMENT FOR STOVE PIPES.—Abram P. Anthony, Morrison, Ill.

I claim the wire, B, forming the ring, B2, and loops, B1, in combination with the ring, C, by means of which it may be clamped upon a stove pipe substantially as and for the purpose set forth.

65,153.—LATH FOR PLASTERING.—Ellicott D. Averell, New York City.

I claim a lath constructed with countersunk apertures, A', substantially as herein set forth for the purpose specified.

65,154.—ROTARY STEAM ENGINE.—Thomas Banta, Hoboken, N. J.

I claim, 1st, The combination of the rings, R S T U, with the stuffing boxes, L M N O, shafts, G H I J, radial arms, D E F, and flange, V, substantially as herein shown and described and for the purposes set forth.

2d, The combination of the flanged ring, W, and rods, X, with the shaft, J, flange, V, and flanged end of the packing box, O, substantially as herein shown and described and for the purpose set forth.

65,155.—CLASP FOR SECURING SHIRT COLLARS.—John Barbier, Boston, Mass.

I claim the within-described collar clasp, consisted of the two plates, a a', when pivoted together at or near the center, in combination with a spring, e, one of the plates being provided with a projection, f, which passes into or through an opening in the extremity of the opposite one, and the clasp being attached to the shirt by means of a stud, g, all arranged and operating substantially as described.

I also claim, in combination with the above, the socket, h, for receiving a pin projecting from the cravat or tie, substantially as set forth.

65,156.—APPARATUS FOR TEMPERING STEEL SPRINGS.—Ira N. Bevans (assignor to Eli Terry), Terryville, Conn.

I claim the feed rollers, C, in combination with the vessel, A, and receiving drum, D, substantially as and for the purpose set forth.

65,157.—BASKET FOR FEEDING TARRED CORNCOBS TO FURNACES.—Ezra Benim, Dayton, Ohio.

I claim the cob kindling basket, constructed substantially as herein described and for the purpose specified.

65,158.—CULTIVATOR.—Hiram Boys, Rushville, Ind.

I claim, 1st, The frame, A, as constructed with adjustable tail piece, a, arms, b, with swivels for connecting the shovel beams and rollers, E, with chains for attaching the shovel bars, when combined, arranged and operating in the manner and for the purposes herein specified.

2d, The beams, D D, shovel bars, f f', and shields, e e, connected by the adjustable bars, m m, in the manner and for the purposes set forth.

65,159.—MOLASSES VESSEL.—William Briggs (assignor to himself and Thomas Holmes), Bristol, R. I.

I claim, as a new article of manufacture, a pail or bucket, constructed and furnished as herein described, in combination with the gate, o, as herein set forth and for the purpose specified.

65,160.—FAUCET.—A. Brinckmann, New York City.

I claim the tube, A, spigot, B, spring, D, within the case, C, in combination with the washers, F G, having stops, c d, as herein described for the purpose specified.

65,161.—BOLT CUTTER.—Walter Britton, Abingdon, Ill.

I claim the guide, A, bars, B B', connected by a pivot bolt, b, at one end, and provided with cutters, c c, at the opposite end, and the levers, D D, provided with eccentrics, g g, all being combined and arranged substantially in the manner and for the purpose set forth.

65,162.—PIPE WRENCH.—James R. Brown, Boston, Mass., assignor to himself and W. S. Lovell, Cambridgeport, Mass.

I claim, as my improvement the combination of the staple or clasp, the series of holes and the fulcrum pin and its spring, and their arrangement with the two crossed jaw levers, substantially in manner as specified.

65,163.—CORSET CLASP.—Mellissa E. Bulkley, Providence, R. I.

I claim the use of the shield, s, or its equivalent, in combination with the clasp, constructed substantially as described for the purpose specified.

65,164.—HORSE RAKE.—Israel L. Bullock, Marcy, Ind.

I claim the levers, J J, having elastic pawls, L L, attached in combination with the shaft, M, provided with the foot boards, j j', and connected with the levers, J J, substantially as and for the purpose set forth.

65,165.—PENCIL SHARPENER.—Hubert Burgess, San Francisco, Cal.

I claim the case or box, A, tray, B, and file, C, for sharpening pencils, substantially as shown and described.

65,166.—CONVERTING MOTION.—H. Burk, Mineral Point, Ohio.

I claim the construction and arrangement of the pitman, D, the legs, a b, of which straddle the wheel, C, and are provided with rolls, c d, the former running in the groove, E, of the said wheel, and the other running on the metallic plate, f, of the bed, A, substantially as described and for the purpose specified.

65,167.—CAR SPRING.—F. Cajar, New York City.

I claim the improvement of a coiled or spiral spring and buffer for cars, etc., by providing the lower margins of the coil (viz., of their individual cones), with the ribs or projections, a and b, for the purpose and substantially as described above.

65,168.—VEHICLE.—John S. Campbell, Newton, N. J.

1st, I claim the carriage or sleigh body, A, when made of hard rubber and provided with flanges, b and c, and cross pieces, d, substantially as and for the purpose herein shown and described.

2d, The running gear of wagons and sleighs, when made of rubber, substantially as herein shown and described.

65,169.—PATTERN SIFTER.—Edward Card, North Providence, R. I.

I claim the combination of the steel arms, D D, and screw spindle wedge, E, constructed as described.

And again, I claim the combination of the device above set forth, with the plate, A, having a hole through its center countersunk on one side, as herein described and set forth.

65,170.—LINIMENT.—E. M. Carpenter, Elkhart, Ind.

I claim the liniment compounded of the ingredients, and for the purpose substantially as herein described.

65,171.—MELODEONS AND OTHER WIND INSTRUMENTS.—Riley W. Carpenter, Brattleboro, Vt. Antedated May 23, 1867.

1st, I claim the arrangement of the tremolo valve in or on the swell, substantially as specified.

2d, The connection of the tremolo valve with the key or keys of the instrument, in such manner as to bring it under perfect control of the finger by the independent action of the latter on the key, essentially as herein set forth.

65,172.—BATH TUB.—John Carroll, New York City.

1st, I claim the bath tub consisting of the body, c, with a half circular bottom, head rest, a, and foot rest, b, all composed of sheet metal, and surrounded by a layer, B, of thin wood, in such a manner as to conform to the shape of the inside of the tub, the wooden foot board, C, adjustable support, D, and metallic lining, c, substantially as herein shown and described.

2d, The thin covering, B, of wood, when laid around the body of a bath tub, with semicircular bottom, substantially as and for the purpose herein shown and described.

65,173.—MACHINE FOR CUTTING SHEET LEAD.—S. E. Chubbuck (assignor to Joseph H. Chadwick), Roxbury, Mass.

1st, I claim the arbor, G, provided with the rotary cutter, H, and adjusted in the hollow shank, B, of the arms, C, by means of the spring, I, and set screws, J K, substantially as described for the purpose specified.

2d, In combination with the above I claim the transverse racks, E, guides, D D, in which the cross heads, b, slide, pinion, F, and transverse bar, L, substantially as described for the purpose specified.

65,174.—FLUID FOR DISINFECTING AND EMBALMING.—Henry C. Coffman, Washington Court House, Ohio.

I claim a disinfecting and embalming compound, prepared substantially as described and for the purpose set forth.

65,175.—TREATMENT OF SULPHATE OF ALUMINA.—Alexander Augus Croll, London, England.

1st, I claim the employment of carbonate of lime with the sulphate of alumina when the latter is in a heated state, substantially as herein described.

2d, The treatment of the roasted aluminous earth or clay with hot oil of vitriol, substantially as herein described.

65,176.—MODE OF CONSTRUCTING PAPER BAGS, ETC.—Luther C. Crowell, West Dennis, Mass.

1st, I claim the combination of the strips of tin or iron with wrapping paper or its equivalent when cemented, pasted, or otherwise securely connected together, and used as a self-sealing wrapper, as a new article of manufacture.

2d, The paper-bag, M, in combination with the opening, O, and thin strip of tin or folder, A, constructed and operating substantially in the manner and for the purpose herein shown and described.

65,177.—CUTTER, GRATER, AND SHARPENER.—Ephraim Culver, Shelburne Falls, Mass.

I claim the arrangement and combination of the revolving cylinder, c, having its projecting and transverse saw teeth of unequal length, and the cylinder, b, with the knives attached to it, and the grindstone, d, substantially as and for the purpose described.

65,178.—GAGES FOR HOLDING CLAPBOARDS.—William H. Cummings and Isaiah Babcock, Roonsboro' Iowa.

We claim the combination of the adjustable bars, a b' and d, the fixed dog, g, and the spring dog, h, and the lever, k, or their equivalent devices, arranged and operating substantially as and for the purposes herein described.

65,179.—COMPOSITION FOR COATING ROOFING, ETC.—Oscar A. Day and George W. Bishop, Saratoga Springs, N. Y.

We claim the combination substantially as herein described and for the purpose specified.

65,180.—HOISTING APPARATUS.—Joseph A. Dayton, (assignor to himself and Joseph Starr), New London, Conn.

I claim an improved hoisting apparatus formed by the combination of the chain wheel, B, shaft, D, gear wheels, E F, shaft, G, gear wheel, H, endless screw, I, shaft, J, and cranks, K, or their equivalent, with each other, and with the frame, A, of the machine, substantially as herein shown and described and for the purpose set forth.

65,181.—METAL CANS AND BOXES FOR PAINTS AND OTHER MATERIALS.—Frederick W. Devoe, New York City.

1st, I claim the can constructed with the internal swage, a, at the inner part thereof, substantially as and for the purpose specified.

2d, The combination of the rebate, b, of the cover, B, the internal swage, a, of the body of the can, and the gasket, c, substantially as and for the purpose specified.

3d, The recesses, d, in the cover, B, in combination with the upper edge of the body, A, and the internal swage, a, substantially as and for the purpose specified.

65,182.—ATTACHING THILLS TO VEHICLES.—George F. Dietz, Burlingham, N. Y.

I claim a carriage clip formed in two parts so as to be adjustable, when so constructed that one part can be moved on the other without loosening the clip on or detaching it from the axle.

65,183.—SHAFT COUPLING.—William H. Doane and John Richards, Cincinnati, Ohio. Antedated February 16, 1867.

1st, We claim the ring nut, c, for connecting the conical compressing shells, b b, in a shaft coupling, in the manner and for the purposes specified.

2d, We claim the sleeve, a, compressing shells, b b, and ring nut, c, of a shaft coupling, combined and operated in the manner and for the purpose set forth.

65,184.—BASE BURNING STOVE.—William C. Durant, West Troy, N. Y.

I claim a fuel reservoir of "base burning" stoves, having a series of horizontal apertures or openings, a a a, formed in and through its sides, said series of openings or apertures extending in succession from its base part upward to its top part, in manner substantially as herein described and for the purpose set forth.

Also, in combination with said series of apertures or openings, a a a, and respectively with each other, I claim a series of deflector plates or bands, G, said series extending in alternate succession with said apertures from the base part or bottom of the reservoir upward to its top, in manner substantially as herein fully set forth and for the purpose specified.

65,185.—MACHINE FOR CUTTING PLATE.—J. W. Durgin (assignor to E. Q. Norton and A. H. Norton), Bangor, Maine.

I claim the cutting of slate for roofing purposes, composed of a knife of a shape corresponding to that in which it is designed to cut the slate, and pivoted to the end of a bed piece of a form corresponding to that of the knife, and of such dimensions that the knife may work over it with a lever or treadle applied to the knife, all arranged substantially in the manner as shown and described.

65,186.—COMPOSITION FOR SOAP.—C. J. Eames and C. A. Seely, New York City.

We claim a disinfectant soap compounded of the ingredients as above set forth.

65,187.—ARTIFICIAL LEGS.—Jonathan Emery, Cedar Falls, Iowa.

I claim, 1st, The construction of the frame, D D, in the form shown in figure 6, of the drawings, and so that it is applicable to the standard, b, on the steel sole plate, c, and will afford a bearing forward of and in rear of the axis of motion of the leg, A, and also serve as the means for connecting the leg to the foot, all in the manner herein described and shown.

2d, The construction of the heel extension, a, and concave ankle portion b, upon the leg, A, in combination with the heel spring, d, frame, D, and foot section, B, substantially as described.

65,188.—TOBACCO POUCH.—John G. Ernst, Baltimore, Md.

I claim the elongated hinges, d d, of frame, B, in combination with spring, c, or its equivalent, the concaved metal plate, D, and nipple, E, the whole secured to bag or pouch, A, in the manner described and for the purpose specified.

65,189.—WHEAT DAMPENER.—Jacob Eslaman, Belleville, Ill.

I claim the combination of the conveyor-screw, B, and mixing trough, A, with the steam dampening apparatus, consisting of the spout, c, and steam-pipe, E, arranged in manner described

65,190.—TANNING.—O. B. Evans, Buffalo, N. Y.

I claim compounds or solutions for tanning hides and skins, composed of the ingredients specified, mixed together in or about the proportions described, substantially as and for the purposes set forth.

65,191.—MACHINE FOR DRILLING HARVESTER GUARD FINGERS.—Jerome Fassler, Springfield Ohio.

I claim the main frame, A, constructed as described, and mounted upon the hollow pillars, B B, and bed plate, C, as and for the purpose set forth.

The crank, S, connecting clutch rod, R, and lever, T, in combination, the two former being behind, and the latter in front of the frame, as and for the purpose shown and described.

Arranging the stop lever, T, and hand wheel, W, with the other operative mechanism in the manner and for the purpose shown and described.

The construction and arrangement of the plug, k, and follower, n, in the end of a hollow drill stock as described.

The steel pattern bar, p, with the clamps, q q, as and for the purpose set forth.

The trough, o, constructed as described and for the purpose set forth.

65,192.—MACHINES FOR MILLING HARVESTER GUARD FINGERS.—Jerome Fassler, Springfield, Ohio.

I claim the combination of the main shaft, G, which carries the cutters and the counter shaft, H, which receives motion from the driving power, both mounted upon the carriage, F, with the feed shaft, S, constructed and arranged substantially in the manner shown.

The arrangement substantially as shown of the main shaft, G, and counter shaft, H, both upon the vertically moving carriage, F, cutters, O O, gearing J K, and pulley, L, all outside of the bearings of said shafts.

Securing the guard fingers, e, to the holding bed, g, in the manner shown to hold them firmly while being faced off by the cutters.

The combination of the detachable holding bed, g, with the carriage, P, whereby duplicate holders may be used and one set being prepared while another is being operated upon in the manner shown and described.

The detachable holding bed, g, carriage, P, and feed screw, Q, combined with the hand wheel, R, worm, S, and driving band, T, all combined for joint operation substantially as shown.

The combination of the set stop, Y, let off device, W X Z, and dropping box, V, to stop the movement of the carriage, P, at the desired point.

The detachable holding block, g, in which two or more guard fingers may be secured at one time, in combination with the carriage, P, and cutters, O, of a milling machine.

65,193.—MACHINES FOR SLOTTING HARVESTER GUARD FINGERS.—Jerome Fassler, Springfield, Ohio.

I claim securing the guide rods, constructed as described to the table, A, substantially in the manner shown and set forth.

The rods, L L, to connect the heads, K K, of the saw frame in connection with the independent guide rods, H H, in the manner shown and for the purpose set forth.

The straining heads, M, constructed as described, with the set screws, O O Q, and the pin, P, passing through a horizontal slot for the purpose set forth.

The holding block, g, constructed as described to hold the guard finger, h, while being slotted as set forth.

In combination with the holding block, g, the point holder, f, all constructed as and for the purpose set forth.

The carriage, T, and holding blocks, f and g, combined and arranged as set forth.

The combination of the carriage, T, holding blocks, g and f, and the saw frame, K L, when the carriage and holding blocks are located and arranged between the parts of the saw frame as set forth.

The arrangement of the shaft, V, pawl, W, and crank bar, Y, with the ratchet wheel, U, and head, K, of the saw frame to produce an automatic feed for the carriage, T, as set forth.

In combination with the automatic feed motion herein described, the lever, b, spring, c, latch, d, and pin, e, for the purpose of disconnecting the said feed and arresting the forward motion of the carriage, T, as and for the purpose set forth.

65,194.—FIRE ESCAPE AND ALARM.—Julius Fischer, New York City.

1st, I claim the combination of an alarm bell or of alarm bells, with a life saving apparatus connected in such a manner that the life-saving apparatus, when being brought in readiness to be used, will set the bell or bells in motion, for the purpose as herein fully described.

2d, I claim in combination with the above a chain attached to the ladder, by means of which said ladder may be unwound from a windlass, for the purpose as herein described.

3d, I claim the combination of a sliding frame, with a windlass and chain ladder, the whole being constructed and operating as and for the purpose herein fully described and set forth.

65,195.—WHEAT DRILL.—D. S. Fisher, Cedar Spring, Ind.

I claim the rotating shaft, B, provided with the pins, a, in combination with the perforated board, C, and the reciprocating slide, D, operated by the cam, H, all arranged substantially in the manner as and for the purpose set forth.

65,196.—HARROW.—D. S. Fisher, Cedar Spring, Ind.

I claim the revolving harrows, F F, secured to the lower ends of vertical shafts, D D, which are fitted loosely in bars, A A, or any suitable framing, substantially as and for the purpose set forth.

2d, The circumferential grooves, c, in the upper parts of the harrow shafts, D D, in combination with the pins, d, all arranged substantially as and for the purpose specified.

65,197.—CORN PLANTER.—D. S. Fisher, Cedar Spring, Ind.

1st, I claim the rotating shaft, D, provided with pins, a, and the slide, E, in combination with the reciprocating slide, F, spring, H, and the wheel, I, provided with one or more projections, r, all arranged to operate in the manner substantially as and for the purpose set forth.

2d, The hoe, N, attached to the shaft, L, in combination with the spring, O, and the wheel, I, provided with one or more projections, r, and the arm, g, on one end of shaft, L, all arranged to operate in the manner substantially as and for the purpose set forth.

65,198.—PLOW.—D. S. Fisher, Cedar Spring, Ind.

1st, I claim the rising and falling or adjustable plow bars, E F, one or more arranged with a lever or levers, C D, and having rotary coulters, J, attached all arranged substantially as and for the purpose set forth.

2d, The spring catches, J* one or more arranged with the bars, E F, and levers, C D, substantially as and for the purpose specified.

3d, Providing the coulter, J*, with radial ribs, a, substantially as and for the purpose set forth.

65,199.—PROPELLING WHEELED CARRIAGES.—D. S. Fisher, Cedar Spring, Ind.

1st, I claim the frame, A, with small frame, D, shaft, a, spring, E, cogs, d t, and axle, B', with cog-wheel, b, all constructed, arranged and operating in the manner substantially as and for the purposes specified.

2d, The segment, F, shaft, G, ratchet, I, lever, H, and bar, R, all constructed and arranged for guiding the vehicle in the manner as set forth.

65,200.—HYDRAULIC ELEVATOR.—Henry Flad and George P. Herthel, Jr., St. Louis, Mo.

1st, We claim the combination of the cylinder, R, piston, b, sheaves, b1 b2, and system of pulleys, as arranged in relation to the reservoir, C, or supply pipe, D, and its connecting pipe, d, substantially as shown and described.

2d, The arrangement with the foregoing of the secondary reservoir, C', substantially as and for the purposes shown and described.

65,201.—CARRIAGE SEAT.—Chester D. Flynt, Collinsville, Ill.

I claim the spring cushion, C, in combination with the frame, A, and the bands, B, substantially as described.

65,202.—PROPELLER.—F. G. Fowler, Springfield, Ill.

1st, I claim the eccentric, e, in combination with the blades, a", hung on pivots placed on their vertical central line, and revolving in the manner and for the purpose substantially as described.

2d, The chain wheels, 1", and chain, r', or their equivalents, in combination with the eccentric, e, and blades, a", arranged in the manner and for the purposes substantially as shown.

65,203.—MEDICAL COMPOUND FOR TREATING RINGBONE, SPAVIN, ETC., IN HORSES.—Abel M. French, Burton, Ohio.

I claim the herein-described compound, formed of the ingredients named, and applied substantially as and for the purpose specified.

65,204.—BOUQUET HOLDER.—A. D. Frye, Jr., New York City.

I claim the tube, A, formed in one or more parts, in combination with the reversible scroll, B, either removably or securely attached for the purpose of holding bouquets or handkerchiefs, substantially as herein shown and described.

65,205.—APPARATUS FOR EVAPORATING AND CONCENTRATING CANE JUICE AND OTHER LIQUIDS.—Alfred Fryer, Manchester, England.

1st, I claim treating cane juice and saccharine solutions and liquids, in order to obtain what I term "Fryer's Concrete" or sugar, in a non-crystalline or semi-crystalline state, by exposing it or them to heat in shallow trays, and then to heat in a revolving cylinder, substantially in the manner herein set forth.

2d, Treating solutions and liquids for evaporating and concentrating purposes, by exposing them to heat in shallow trays and then to heat in a revolving cylinder, as herein set forth.

3d, Treating cane juice and saccharine and other solutions and liquids for evaporating and concentrating purposes by passing it or them through or into a revolving cylinder, heated from the inside and through the inside of which heated air is forced or driven.

4th, The machinery or apparatus for the concentration of cane juice and saccharine, and other solutions, and for the evaporation of liquids, consisting of shallow trays in combination with revolving cylinders, all constructed and acting substantially in the manner described.

62,206.—UMBRELLA.—Stephen F. Gates, Boston, Mass.

I claim, in combination with the tubular handle, sliding rod, and feather or spring stop, the groove or grooves in the tubular handle, operating as and for the purpose substantially as set forth.

65,207.—BURGLAR ALARM LOCK.—Auguste Leon Gennerat, Paris, France.

1st, I claim the construction and arrangement of the piece, A, secured to the piece, B, of the handle lock, working in the hollowing of the partition stop piece, D, to which the hammer, G, is secured, having trunnions, D D", piece, C, upon the trunnion, D", working from K to H thereon, spring, F, stop pin, M, and bell, as herein set forth for the purpose specified.

2d, In combination with the above, I claim the adjustable swivel, T, whereby the ringing of the bell is prevented, as herein set forth for the purpose specified.

65,208.—STEM-WINDING WATCH.—Fayette S. Giles, New York City.

I claim the toothed ring, C, in combination with the spur wheel, A, the spring barrel and the contrate wheel, c, attached to the winding stem or arbor, substantially as and for the purpose herein set forth.

65,209.—FENCE.—E. C. Gordon, Sevastopol, Ind.

I claim supporting and connecting the sections, A A, as constructed, by means of the anchor, B, in the manner herein specified and for the purposes set forth.

65,210.—GATE.—Gideon S. Granger and William Northrop, Wayland, N. Y.

We claim hinging the central post, G, at or just above the surface of the ground, substantially as herein shown and described and for the purpose set forth.

65,211.—SEPARATING CHEESE CURD FROM WHEY.—Sylvester Greene, Rome, N. Y.

I claim in the manufacture of cheese the separating of the whey from the curd, by means of a gradual pressure produced by a perforated plate, and either with or without a strainer, substantially as herein shown and described.

65,212.—PLOW AND COTTON SCRAPER.—J. V. Greif, Laducah, Ky.

I claim the spur or projection, e, formed upon the share, C, and fitting into the slot or hole, f, of the mold board, in combination with the bolt, g, substantially as and for the purpose specified.

65,213.—BOAT-DETACHING TACKLE.—R. H. Griffith, Baltimore, Md.

I claim the rock shaft or rod, A, on which the cams, c c, are secured, when connected with the two pulley blocks, C C, one at each end of the boat, in combination with the pivoted hooks, f f, constructed and operating substantially as and for the purposes set forth.

65,214.—HOP TRELLIS.—Newell F. Guffin, Grovenors Corners, N. Y.

I claim the combination of the poles, A, planted in double parallel rows, and the transverse inclined poles, D, interlocking the former to which they are attached by hoops or loops, C, and eyes, B, substantially as and for the purpose set forth.

65,215.—APPARATUS FOR TEMPERING STEEL WIRE.—John Hallas, New York City.

1st, I claim in an apparatus for hardening and tempering wire, substantially of the character described, causing the wire, after it has passed through the heating pot in the furnace, or through the latter and oil or other bath, to be run or returned in its passage through the tempering pot for after collection or take up, to the same side of the furnace from which the green wire was fed, substantially as specified.

2d, The arrangement on or in connection with the same furnace in which is located the first or heating pot, B, of the tempering pot, F, having its temperature controlled by dampers, essentially as and for the purpose or purposes herein set forth.

65,216.—SAFETY BRIDLE.—S. B. Hartman, Millersville, Pa.

I claim the employment or use of friction rollers, b, applied to the cheek straps, C, of the bridle, in combination with the bit, D, head strap, E, and reins, d, all arranged substantially as and for the purpose set forth.

I further claim the elastic reins, e, in combination with the reins, d, cheek straps, C, and bit, D, all arranged and applied to the bridle, substantially as and for the purpose specified.

65,217.—SAWING MACHINE.—Henry Hassenpflug, Huntingdon, Pa., assignor to hsmself and Edward Hassenpflug.

I claim the feed device, consisting of the weighted cord, l, arranged in relation with the pawl, p, and ratchet bar, q, all made as described, and operating so that the carriage shall be moved towards the saw, as herein set forth for the purpose specified.

65,218.—HARVESTER.—B. G. H. Hathaway, Rock Stream, N. Y.

1st, I claim the spherical case when attached to the axle and constructed in two parts, C and C', and having a projecting cylindrical pipe, C", which form bearing at P' and P", for the attachment of the cutting apparatus, substantially as set forth.

2d, The combination of the lever, H, yoke, H1, clutch, H2, radial arms with depression, D1, and the planet wheels, E, when constructed and arranged substantially as set forth.

3d, The braces, N and N' and N", in combination with the tongue, O bracket, P, and pipe, C", when constructed and arranged substantially as set forth.

4th, So arranging the braces uniting the cutter bar with the supporting frame of the machine as that they may oscillate upon and around the pipe, C", substantially as set forth.

5th, The combination of the lever, Q', arm, Q, bracket, P, and pipe, C", substantially as set forth.

65,219.—HARVESTER.—B. G. H. Hathaway and George M. Hathaway, Rock Stream, N. Y.

1st, We claim the ground wheel, C, in combination with the planet wheels, D, pivoted to its inner face, and a fixed gearing, H', communicating motion to a pinion, E, so arranged in combination with a detent that it can revolve only with the forward motion of the ground wheel, substantially as described.

2d, The combination with the planet wheel, D, pinion, E, detent, E', and rachet wheel, F, when said parts are respectively constructed and arranged substantially as set forth.

3d, The hemispherical case, H, when constructed with internal gearing, H', and having a collar by which it is attached to a rigid axle, so as to dispense with a frame, substantially as set forth.

4th, The combination with the ratchet wheel, F, bevel wheel, G, and collar, I, with its pins, I', yoke, I", rod, I"', and lever, I"", substantially as and for the purpose set forth.

5th, The arrangement of the case, H, axle, B, tongue, A, brace, T, shoe, M, and frame, O, substantially as set forth.

6th, The combination of the wheel, E, arm, Q, frame, O, and lever, P, said parts being respectively constructed and arranged as and for the purpose set forth.

65,220.—CLUTCH.—Albert Heth and Gaylon Hall, Adams' N. Y.

We claim a clutch for suspending hay forks and other articles, said clutch consisting of a frame, A, provided with adjustable sliding brace, i, and revolving pointed pins, f and h, and with a swivel hook, e, all made and operating substantially as herein shown and described.

65,221.—GOVERNOR.—Charles Hindle, Brooklyn, N. Y. Antedated May 16, 1867.

I claim the tension spring, J, and regulating screw, l, in combination with the governor, B, and valve, c, in the pump barrel, A, arranged substantially as and for the purpose set forth.

65,222.—BEDSTEAD.—Jacob Hoert, New York City.

I claim the arrangement and combination of the toggle braces, B D, legs, E, and frame, B, with the flexible bottom, A, constructed and operating substantially as and for the purpose described.

65,223.—ROLLER FOR FLOOR CLOTH.—Robert Hoskin, Brooklyn, N. Y.

I claim a roller, which is constructed substantially as described, for receiving cloth upon it for drying, so that the surfaces of the cloth are kept separate.

65,224.—MACHINE FOR WASHING LEATHER.—Adolphus Howard, Wellsville, N. Y., and George F. Howard, Chicago, Ill.

1st, We claim two or more revolving brushes, or their equivalents, for washing or removing the sediment from leather, for the purposes and substantially as herein described.

2d, In combination with the brushes, E E, the tanks, B B, or equivalents, for the purposes and substantially as herein set forth.

65,225.—CARTRIDGE BOX.—Charles Howlett, New York City, assignor to himself and William Freeborn.

I claim a cartridge holder, formed of a series of strips or plates of suitable material, with raised edges or grooves to clasp the base of a cartridge, when arranged in combination with a cartridge box, substantially as and for the purpose set forth.

65,226.—MOLDING MACHINE.—George S. Hudson, Ellisburgh N. Y.

I claim the combination of the cutter shaft, D, the reciprocating frame, E and the walking beam, G, or the equivalents of them, or either of them, the said combination being so arranged, substantially as described, that by its mode of operation the cutter shaft, D, and the cutter head, z, shall rise and fall while in motion to cut any required depth or curve in wave or serpentine wood moldings.

65,227.—APPARATUS FOR CONCENTRATING SULPHURIC ACID AND OTHER LIQUIDS.—John Hughes, Brooklyn, N. Y.,

assignor to himself and James R. Hitchcock, New York City.

1st, I claim the flat pans, E or H, arranged in a furnace, substantially as herein shown and described.

2d, The furnace, A, provided with a longitudinal chamber, B, and with the transverse plates, D or I, substantially for the purposes and in the manner herein shown and described.

3d, The manner herein shown and described of transferring the acid from one pan to another, either by sponts, e, and an inclined chamber, B, or by means of syphons, K K, substantially as herein shown and described.

4th, An apparatus for concentrating sulphuric acid, made and operating substantially as herein shown and described.

65,228.—CAR COUPLING.—R. H. Huston, Keokuk, Iowa.

1st, I claim a draw head with a chamber, B, for receiving a catch head, G, of the form described, said chamber having its side walls made flaring so as to cause the escape of the catch head should a car leave the track, substantially as described.

2d, A yielding guide plate, C, or its equivalent, in conjunction with a chamber, B, of the form, substantially as described.

3d, The combination of the draw head, which has a laterally flaring chamber, B, and the coupling bar, G, with semi-ellipsoidal catch heads on its ends, substantially as and for the purposes described.

65,229.—LANTERN.—John H. Irwin, Chicago, Ill.

1st, I claim extending the top of the inner globe, F, above the holes, d, in the lantern top, substantially in the manner and for the purposes specified.

2d, I claim supporting the said inner globe in such a manner that the oil cup can be removed from the lantern without disturbing said globe, substantially as specified.

3d, I claim so constructing a lantern that the interior globe can be removed from the lantern independently of the oil cup, substantially as described.

65,230.—LAMP.—John H. Irwin, Chicago, Ill.

1st, I claim, in combination with the lamp or its burner, the tube, D, or its equivalent, arranged and operating substantially as and for the purposes specified.

2nd, I claim in combination with said tube, B, a cooler, E, arranged so as to operate substantially as described.

65,231.—RUBBER BOOT FOR HORSES.—Joseph H. Jennings, Cambridgeport, Mass.

I claim for the curative treatment of the hoofs and lower parts of the legs of horses, a rubber boot, constructed and arranged substantially as specified.

65,232.—WINDOW-SASH FASTENER.—Ezram Johnson, Joliet, Ill.

I claim the toothed wheel, F, in the recess, b2, of the casing, B, attached to the end of the shaft, E, cam, D, and toothed bar, G, when constructed, arranged, and operating as herein set forth for the purpose specified.

65,233.—MINCING KNIFE.—Stephen C. Ketchum, Winchendon, Mass.

1st, I claim a double-bladed chopping knife, the blades being so pivoted to the shank as to give a drawing cut at each stroke, substantially as described.

2d, I claim so hinging two or more blades or knives together, and supporting them in such a position with springs, as to allow the cutting edges to conform to any suitable concave, or the curves of a chopping tray or bowl, as herein described.

3d, I claim the combination of the cutting blades, B B, fulcrum pins, d d, shank, A, springs, C C, with the bolt and thumb nut, D, operating in the manner herein described for the purpose set forth.

65,234.—CHURN.—S. P. Kingsley, Springfield, Wis.

First, I claim the arrangement of the dasher having cylinder, E, beveled arms, i i i, and wires, s S, or their equivalents, when constructed and used in the manner and for the purposes specified.

Second, The combination of the dasher as constructed with the churn box, A, when operating in the manner as set forth.

65,235.—MEDICAL COMPOUND.—Margaret Knotts, Carondelet, Mo.

I claim the medical compound made substantially as and for the purpose described.

65,236.—HOLDER AND SEAT FOR WAGON BRAKES.—Henry C. Kochensperger, Thornville, Ohio.

First, I claim the holder, A, constructed substantially as described, in combination with the brake bar, or its equivalent, as set forth.

Second, The combination of the holder, A, and rubber, D, substantially as and for the purpose specified.

65,237.—HORSE HAY FORK.—E. M. Krum, Nassau, N. Y.

First, I claim the construction as the curved tines, A A, with angular portions, A' A', and with jointing portions, a a, said tines being connected together by means of a pivot, b, and toggle links, c c c d, the link, d, being constructed and operating in the manner shown all substantially in the manner and for the purpose set forth.

Second, The arrangement of the cords, B B B, and line, g', in combination with the pivoted tines, A A', toggle links, c c c, and lever link, d, all in the manner and for the purpose described.

Third, The arrangement of the stop, g, on one of the toggle levers in combination with the lever link, d, of the toggle, c c c d, substantially in the manner and for the purpose described.

65,238.—FAUCET.—John Laing, Hoboken, N. J., assignor to himself and George Nimmo.

I claim a faucet formed with a pipe extending from the seat, l', of the disk valve, n, across the water way, g, and receiving the spindle, i, of said valve, as and for the purposes set forth.

65,239.—BALE TIE.—Henry Lampson, London, England.

I claim securing the ends of the band, a, together by passing the end, a', through the metal loop b, and turning the same back upon the inside of the said band the opposite end, a2, passing through the loop, b', and through the loop, b, and turned back short over the outside of the loop, b, and inserted again in the loop, b', and the latter slipped up toward the loop, b, when all are arranged and operating substantially as herein shown and described.

65,240.—CHEMICAL FIRE ENGINE.—R. Lapham and G. Clark, Jr., Boston, Mass.

First, We claim the admixing of chemicals for producing carbonic acid gas, substantially as described and for the purpose set forth.

Second, The use of pumps when they are employed for forcing upon the fire chemical solutions which when brought together produce carbonic acid gas.

65,241.—TUBE WELL.—Cornelius H. Latham, Randolph, N. Y.

I claim the arrangement of the slotted tube, A, with point, B, shrunk upon it when used in combination with the coupling, E, as constructed with valve box seat and the pump sections, D D, in the manner substantially as and for the purposes herein fully set forth.

65,242.—MACHINE FOR STRAIGHTENING BARS.—George Lauder, Pittsburgh, Pa.

I claim the worm, E, and worm wheels, B and C, arranged relatively to the skewed straightening rolls, B C, and to the housing, A, or its equivalent, substantially as and for the purpose herein set forth,

65,243.—REVOLVING TABLET FOR MULTIPLYING PHOTOGRAPHIC PICTURES.—Jewett Lawrence, Ripon, Wis.

I claim the revolving tablet, G, the cross bar, C, and the standard, E, arranged in the camera, as and for the purpose specified.

65,244.—MACHINE FOR STAMPING CLAY DOOR KNOBS.—George Lawton (assignor to George James), Trenton, N. J.

First, I claim the arrangement and construction of the cams, D, whereby the dies, e, are operated three times in succession the said cams consisting of the parts, h i and k, all made and operating substantially as and for the purpose herein shown and described.

Second, The device for raising the pushers, H, so as to lift the stamped articles out of the matrices, c, the said devices consisting of the cams, o, levers, n, and rods, m, all made and operating substantially as herein shown and described.

Third, The spring, s, when arranged as herein shown and described for the purpose of depressing the pushers, H, as set sorth.

Fourth, The device for forming the small horizontal holes at the bottom of the shank holes in door knobs, said device consisting of the pins, p, tubes, H, springs, q, and pins, r, all made and operating substantially as herein shown and described.

65,245.—ROSE ENGINE LATHE.—Thomas Lippiatt, New York City.

First, I claim the swinging frame, K, suspended from the sliding stock, r, and furnished with the tracing pin, u, in combination with the pattern, E, and sliding tool box, I, substantially as herein set forth for the purpose specified.

Second, The sliding frame, C, main frame, A, and adjustable frame, D, combined and arranged in relation with each other and with the tool box, I, swinging frame, K, and pattern E, substantially as herein set forth for the purpose specified.

65,246.—FASTENINGS FOR CORSETS.—James P. Love, New York City.

First, I claim the manner herein shown and described of securing the steels, b b, in corsets by means of flaps, a and c, and hooks, d, and eyelets or button holes, e, all made and operating substantially as and for the purposes herein shown and described.

Second, The fastenings, f and g, in combination with the flaps, a and c, and steels, b, hooks, d, and eyelets or holes, e, all made and operating substantially as herein shown and described.

65,247.—SHOE SOLE.—Charles B. Loveland, Elizabethport, N. J.

First, I claim the movable metal plate, B, with the continuous bent lip, c, for clasping the sole, d, and having the half sole, b, attached thereto and fastened to the sole, a, by means of the screws and flanged nuts, m, as and for the purpose herein described.

Second, The adjustable metal lift, e, with front and rear set off with the tap, g, employed and fastened to the heel of a shoe by means of the screws, d s, fitting into the flanged nuts, n o, as and for the purpose herein specified.

65,248.—MACHINE FOR CUTTING STUBS.—Warren Lyon, New York City.

I claim the operating of the pivoted plate, E, through the medium of the segment rack, F, and pinion, C, when said plate, E, has a cutting plate, c, attached and is used in connection with a similar cutting plate, d, on a fixed standard or plate, A, to which the plate, E, is pivoted, all arranged substantially as and for the purpose specified.

The combination of devices composing the gage, arranged substantially as and for the purpose set forth.

65,249.—PORTABLE HAY PRESS.—Jacob Mauck, Cheshire, Ohio.

I claim a hay press having capstand, A, ropes, a and b, pulleys, c and d, clevis, I, pins, 2 and 3, carriage, C, stirrups, F, hooks, g g, and braces, f, constructed, combined and operating substantially as herein specified.

65,250.—BUTTON.—George W. McGill, Washington, D. C.

I claim the double or split metal shank for a button herein described in combination with a metal washer, constructed and applied substantially as described.

65,251.—SAWING MACHINE.—R. M. McGrath, Lafayette, Ind., assignor to himself and J. H. Gallagher.

I claim the arrangement of the lever, y', pulley, z, and its cord, x, and the lever, l', for placing within the control of the operator the management of the sawing and feeding devices of the machine.

65,252.—PADDLE WHEEL.—Alexander McKenzie (assignor to himself and William C. Davis), Newport, Ky.

I claim the arrangement of inclined blades or buckets, G, radial arms, B, ob lique secondary arms, C, and brace rings, E, substantially as and for the purpose set forth.

65,253.—CALIPER.—G. L. McKnight, Worcester, Mass.

First, I claim the combination with the slotted standard or screw, B, of the screw, D, for holding the adjusting nut, C, substantially as described.

Second, The combination with the upper part of the body or part, A, of the spring, E, substantially as and for the purposes set forth.

65,254.—STEAM SAFETY VALVE.—E. Meggenhofen, Frankfort-on-the-Maine, Germany, administratrix of the estate of Edward Meggenhofer, deceased.

I claim the arrangement of the bell crank lever, C, connecting rod, D, with reference to the spring balance, A, constructed substantially as and for the purpose set forth.

65,255.—MODE OF BRACING AND STAYING BOATS.—F. Mertens, Cumberland, Md.

I claim the arrangement of the braces, E and F, and the cross ties, G, when constructed and combined with the tightening rods, H, as herein described and for the purpose set forth.

65,256.—COMPOUND FOR CURE OF HOG CHOLERA.—John H. Mesler, Symme's Corner, Ohio.

I claim a compound for the prevention and cure of hog cholera, made of the ingredients set forth.

65,257.—CARRIAGE WHEEL.—William F. Morton, New Haven, Conn.

I claim the double collar with its bars and flanges all cast in one piece, when the double collar is fitted to bind the hub and the flanges to support the spokes, substantially as herein described and set forth.

65,258.—ROOFING MATERIAL.—William Myler, Bridgeport, Ohio, assignor to George W. Johnson, Wheeling, W. Va.

The combination of coal tar, pine tar, soap stone, ochre, or other oxide, and hydraulic cement, substantially as specified.

65,259.—BOTTLE STOPPER.—Joseph Nathan, Washington, D. C.

First, I claim the screw, E, the lower part of its shank being made smooth, substantially as and for the purpose described.

Second, The blocks, b, on the wire, B, constructed and arranged substantially as described.

Third, The combination of the wire, B, blocks, c, yoke, C, screw, E, with the lower part of its shank, made smooth and stopper, 1 g, substantially as and for the purpose described.

65,260.—TRUNK LOCK.—Joseph Nock, Washington, D. C.

First, I claim the use of the crooked lever, E, or its equivalent, in combination with the tumblers, F, more or less in number, and the bolt, D, arranged substantially as described and shown.

Second, I claim the spindle, m, with the spring, n, when inserted and confined in the hasp, substantially as described and for the purposes set forth.

65,261.—TRUNK LOCK.—Joseph Nock, Washington, D. C.

I claim a series of spring tumblers, E, and levers, d, so arranged and combined that the key shall act directly upon a portion of said tumblers to release them from the staple and at the same time shall act on the levers, d, causing them to act upon and release either of the tumblers, in the manner substantially as described.

65,262.—PORTABLE CAMP BED.—Prince Nicholas Ouroussoff, St. Petersburg, Russia.

I claim making the bed in sections filled with cork dust, or its equivalent and furnished with a pocket, d, and flap sheet or covering, c, all substantially as and for the purpose described.

65,263.—STUMP EXTRACTOR.—Isaac Pardee, Vineland, N. J. and R. C. Parvin, Forest Grove, N. J., assignors to R. C. Parvin.

I claim the pawls, G G, resting upon the ledge, a, of the socket, E, with their lower inner corners rounded as shown at b, so that their upper ends will fall by their own gravity against the ratchet bars, F, and engaged therewith, when constructed and arranged as herein shown and described.

65,264.—LOCOMOTIVE PILOT.—B. F. Partridge, Jr., Columbus, Ky.

I claim the horizontal revolving disks, d d d, having their peripheries serrated, pivoted to the under side of the bottom plates, a a, in combination therewith and with the pilot frame, A, and inclined rollers, c, substantially as herein described for the purpose specified.

65,265.—HORSE SHOE MACHINE.—Charles H. Perkins and Richard W. Comstock, Providence, R. I.

I claim the combination in a machine for making horse shoes of the following instrumentalities, a rotary hammer, B, sliding anvil, E, or equivalent apparatus for supporting the shoe blank and the griping tongs, L, arranged relatively to each other and operating substantially as described for the purposes specified.

65,266.—PREPARATION OF PALM LEAF WARP AND WOOF FOR WEAVING.—Franklin Perrin, Cambridge, Mass.

I claim the employment of a lizature in the preparation of palm leaf strips, substantially as set forth.

65,267.—PLASTIC COMPOUND MADE FROM VEGETABLE FIBERS.—W. H Pierson, New Orleans, La.

First, I claim the formation of articles of manufacture, resembling stone, wood, whalebone, shell, horn and other rigid or elastic articles, out of plastic, or semi-soluble pyroxyline, prepared substantially in the manner and for the purposes herein set forth.

Second, I claim the combination of plastic as above described with vegetable or any other foreign matter, substantially in the manner for the purpose set forth.

Third, I also claim making woven cloths and other fabrics, water or air proof, by treating them with plastic, substantially as and for the purposes set forth.

Fourth, I claim the combination of plastic, with drying oils, for waterproofing, and transparencies and other purposes.

Fifth, I also claim combining plastic with metals, and various metallic substances in the pulverulent state, substantially as described.

Sixth, I also claim attaching by means of plastic, fur, plush or other short fiber, to any suitable surface, so as to give a fur-like surface, substantially as set forth.

Seventh, I also claim forming a compound for painting and coloring and other purposes by admixture of plastic and solvents, with paints, oils, dyestuffs and other coloring matter.

65,268.—MACHINE FOR RUBBING AND MIXING PAINTS, CHEMICALS, ETC.—Robert Poole, Baltimore, Md.

I claim a pan or other suitable holding vessel, revolving around its support and a series of rollers or mixers in said pan, revolving around their and a different support, and in the same direction with the pan, substantially as described.

I also claim in combination with a revolving pan and stirrers, a scraper which when let down in the pan will guide and direct the mixed or rubbed material to a central discharge opening in the bottom of the pan, substantially as described.

65,269.—METHOD OF RAISING AND LEVELING RAILROAD RAILS.—S. L. Porter (assignor to himself and W. F. Eaton, Rochelle, Ill.

I claim the bed plate, A, and the slide plate, B, combined with a graduated fulcrum for leveling railroad tracks, constructed and operating substantially as herein described.

65,270.—BOX FOR PUTTING UP TOOTH POWER.—Edmond Queru, New York City.

First, I claim the toilet box, constructed of the material and in the manner substantially as herein set forth.

Second, I claim securing the cutter thereon by the fibrous hinge, I J K, and seal, L M N, substantially as and for the purpose herein set forth.

65,271.—HORSE RAKE.—Joseph S. Randall, Grand Rapids, Mich.

First, I claim the independent sliding rake teeth furnished with springs and arranged upon a hinged bar, G, and operated substantially in the manner and for the purpose described.

Second, The combination of the independent sliding rake teeth furnished with springs with the hinged bar, G, substantially in the manner and for the purpose described.

Third, The combination of slotted bar, F, hinged bar, G, forked pieces, g, and curved rake teeth, J, with springs, b, arranged upon a frame, A, substantially as described.

Fourth, A vertically adjustable vibrating fork, in combination with a vibrating hay rake, substantially as described.

Fifth, The arrangement of the springs, b, substantially in the manner and for the purpose described.

65,272.—SLEEPING CAR.—J. Wyatt Reid, New York City.

First, I claim the bed, D, suspended by chains, a, horizontal shaft, d, provided with ratchet and pawls, hooks, l l, and s s, when constructed and arranged within the sleeping car, substantially as herein set forth and for the purpose specified.

65,273.—PORTABLE SHELF.—Benjamin F, Rice, Boston, Mass.

I claim the pivoted or jointed parts, 1 d, and g k, in combination with a portable shelf or receptacle, as a new article of manufacture.

65,274.—HANGER FOR SHAFTING.—John Richards, Cincinnati, Ohio.

I claim a hanger for shafting constructed with the pivoted box support, Y and its means of adjustment, operating substantially in the manner and for the purpose herein set forth.

65,275.—PROCESS OF CHILLING OIL AND FAT.—J. E. Richardson, New York City.

I claim the method of chilling oil substantially as herein set forth so that the ice is brought in direct contact with the lard in the manner specified.

65,276.—TUBE WELL.—John W. Ricker, Chelsea, Mass.

I claim in combination with the induction well tube, a coiled spring arranged to operate substantially as and for the purpose set forth.

Also in combination with a well tube, the concave surfaces and triangular pointed drill, substantially as set forth.

65,277.—MODE OF SECURING THE TINES OF FORKS AND RAKES TO THEIR HANDLES.—J. P. W. Riley, Montrose, Pa.

First, I claim making the tines of a hay fork in two parts, which are secured in a mortise in the handle or ferrule and secured in position by means of keys or wedges, substantially as herein shown and described.

Second, In combination with the double tines, C C, I claim the double tines, D D, which when inserted in the handle in the manner specified will convert the device into a manure fork, and can be removed whenever desired, substantially as herein shown and described.

65,278.—CORN PLANTER.—Benjamin F. Robertson, Cap. au Gris, Mo.

I claim the employment of the partition, D, for the purpose of dividing and scattering the seed, substantially as described and set forth.

65,279.—FRUIT PICKER.—Oliver P. Rogers (assignor to himself and D. S. Barlett, Roxbury, Mass.

I claim a device for picking fruit, constructed in the manner substantially as herein shown and described.

65,280.—STEAM GENERATOR.—Robert P. Rogers and James Black, Philadelphia, Pa.

We claim, First, The beveled enlargement, a, of the boiler in combination with the curved or bowed tubes, B, for the circulation of the water, said tubes being attached at their upper ends to said enlargement, a, and at their lower ends directly to the body of the boiler in the manner and for the purpose substantially as shown and described.

Second, The construction of the tubes, B, with a continuous curve from one connection to the other of boiler, substantially as herein set forth.

Third, The screw nuts in combination with the outside circulating tubes and the shell of the boiler one at each end, substantially as herein set forth.

65,281.—STEAM GENERATOR.—Robert E. Rogers and James Black, Philadelphia, Pa.

We claim, First, The combination of the boiler, A, having the beveled enlargement, a, with the exterior curved tubes, B, for the circulation of the water and the flue tubes, C, in the manner and for the purposes substantially as described.

65,282.—WASHING MACHINE.—Robert Rooke, Empire City, Oregon.

I claim the founders, A, in combination with a rotary tub, C, placed within a fixed tub, A, and all arranged to operate substantially in the manner as and for the purpose herein set forth.

65,283.—DEVICE FOR SUSPENDING HAY FORKS.—W. S. Salisbury, Adams Center, N. Y.

I claim the two arms, A, pivoted together at one end and provided with points, E, at the other, in combination with the ratchet and spring pawl, substantially as and for the purpose described.

65,284.—FENCE.—J. W. Sanders, Ripon, Wis.

I claim the portable sections, A, as constructed, when used in combination with the stays, g g, blocks, b, and studs, in the manner and for the purposes specified.

65,285.—LANTERN.—Hugh Sangster (assignor to Horace Parmalee and William H. Bonnell), Buffalo, N. Y.

I claim, First, The combination of the springs, I I, catches, J J, and rim, G, with the apertures, R, as and for the purposes herein substantially set forth and described.

Second, The springs, when constructed of the parts, P P, as shown in fig. 5, and put together as described.

65,286.—HEATING ATTACHMENT FOR OIL LAMPS.—Egbert O. Schartan, Philadelphia, Pa.

I claim the chamber, P, with the kettle, J, with the lower half of the jointed glass chimney, when arranged, used, and combined as herein described and for the purposes set forth.

65,287.—LIFE PRESERVER.—Jehyleman Shaw, Bridgeport, Ct.

I claim the life preserver, constructed as described, consisting of the water and food receptacles, D E, attached to the portion, A, the water receptacle, D, provided with the air tube, G, and drinking tube, F, the food receptacle provided with the opening, H, closed with the plug, I, and the elastic bag, J, substantially as described for the purpose specified.

65,288.—PILL MACHINE.—Joseph H. Shaw, Saco, Me.

I claim the combination of the two curvilinear grooved plates, a a', united and operated by the two radial arms, c d, the plate, a, moving upon the stationary plate, a', and having for its axis the bolt, f, all as and for the purposes specified.

65,289.—GRATE BAR.—Joseph Sherman, Burlington, N. J.

First, I claim the horizontal tubular grate bars, A, open at B, and constructed with small orifices, a a, for the escape of the air on the three sides nearest the fire, and also with an opening, C, at or near the rear end, substantially as and for the purpose set forth.

Second, Ventilated grate bars, constructed with a vertical tubular and perforated extension, D, of the horizontal tubular portion of the bars, A, substantially as described,

65,290.—RESERVOIR DAMPING BRUSH.—Walter Shriver, New York City.

I claim, as a new article of manufacture, a reservoir damping brush for wetting paper for copying letters, arranged and constructed substantially as and for the purpose described.

65,291.—CAP FOR SPINNING MACHINES.—Joseph Smith, Loth, Belgium.

I claim the adjustable ring, B, in combination with the cap, A, and spool or bobbin, C, constructed and operating substantially as and for the purpose specified.

65,292.—APPARATUS FOR TANNING.—A. Steers (assignor to the American Tanning Co.), New York City.

First, I claim expressing the exhausted tanning liquor from hides or skins, substantially as herein shown and described, without the use of rollers.

Second, The metallic frame or frames, D, with their wire and cloth for keeping the hides or skins distended while being tanned, substantially as herein shown and described.

Third, Placing the hides or skins between two cloths during the process of tanning, substantially as herein shown and described and for the purpose set forth.

Fourth, Having the hides or skins attached to the frames, D, suspended in the vat by the ropes, f', and springs, n, substantially as herein shown and described and for the purpose set forth.

Fifth, The combination of the rammers, B, with the vat, A, substantially as herein shown and described, so as to produce a reciprocating action upon the skins or hides.

Sixth, The use of press platens, immersed in fluid, buoyantly adjusted and operating without friction, substantially as herein shown and described.

Seventh, The combination of spring platens or plates, l, rammers, B, vat, A, and frames, D, or their substantial equivalents, with each other, substantially as herein shown and described, and for the purpose set forth.

65,293.—SHAFT COUPLING.—John Stephen, Womelsdorf, Pa.

I claim the bar, B, provided with grooves, and the rubber, c c, when used in combination with the barrel, D, and when constructed in the manner substantially as and for the purposes specified.

65,294.—PEGGING MACHINE.—Edgar M. Stevens, Boston, Mass., assignor to William N. Ely, Stratford, Ct.

First, I claim the combination of a vibrating moving awl, with a sliding or vertically moving head, substantially as described.

Second, Combination of the feeding awl with the sliding and swinging head, substantially as set forth.

65,295.—STEAM GENERATOR.—Francis A. Stevens, Chicago, Ill. Antedated May 22, 1867.

First, I claim the ash pan, C, having the short tubes, c, in the sides arranged as herein specified, relatively to the permanently fixed pipes, D, and nozzles, d, discharging steam from the boiler into the tubes, c, as specified, and allowing the ash pan to be connected and disconnected without disturbing the steam connection.

Second, I claim the steam jets, d, blowing into the ash pan of the locomotive, arranged with reference to the exhaust reservoir, H, and the ring of jets, J, for facilitating the exit of the gases, substantially as and for the purpose herein specified.

Third, I claim the exhaust reservoir, H, made to correspond in form with, and mounted in the interior of the smoke stack, I, so as to discharge the the steam from the ring of jets, J, and urge upward the gases in the space between the two conical casings in the stack, in the manner and for the purpose substantially as herein specified.

65,296.—APPARATUS FOR CARBURETING AIR.—Levi Stevens, Fitchburg, Mass., assignor to Norman C. Munson, Shirley, Mass.

I claim the combination of an air-exhausting apparatus with the vaporizer, separate or distinct, in such manner that air may be drawn through the vaporizer and with the hydrocarbon vapors thereof, be drawn out of such vaporizer and into such exhausting apparatus, the whole being substantially as described.

I also claim the arrangement and connection of the air pumping apparatus and the vaporizer separate or distinct, in such manner that the hydro-carbon fluid may pass freely from one into the other of them, so as to stand at one level in both, and so that the wheel of the pumping apparatus while in rotation may revolve in such liquid as specified.

I also claim the combination of the fluid elevator and its operative mechanism, or their equivalents, with the tank, E, the vaporizer, and the air pumping apparatus.

I also claim the combination of the wire gauze disseminator, k l, with the perforated distributor, i, and the series of inclined plates or evaporating surfaces arranged beneath the same as specified.

I also claim the combination of one or more plates, m n o, and clothes, p p p, arranged together in the vaporizer, in manner and so as to operate as set forth.

I also claim the combination of the tortuous passage, G, at the lower part of the vaporizer, with the series of perforated plates, m n o, covered with layers of cloth as explained.

I also claim the arrangement of the tank, E, with the vaporizer and the air pumping apparatus, such tank being made to communicate with the vaporizer by means of an overflow pipe, x, leading up into the vaporizer, as specified.

I also claim the peculiar valve apparatus at the top of the vaporizer, the same consisting of the tube, e, the box, i, the holes, g g, and the annular valve, h, arranged together as described.

I also claim the combination of the fluid elevator and its operative mechanism, or their equivalents, with the vaporizer, arranged substantially as described.

I also claim the fluid elevator, or its equivalent, so arranged as automatically to elevate the carbureting liquid to the top or upper part of the vaporizer, substantially as described.

65,297.—DRAFT EQUALIZER FOR HORSE-POWERS.—Archibald Stewart, Troy, Wis.

I claim the combination of the tumbling rod, A, outer cylinder, B, coiled spring, E, interior cylinder or roller, C, and rod, D, with each other, substantially as herein shown and described and for the purpose set forth

65,298.—APPARATUS FOR REMOVING WATER FROM THE HOLDS OF VESSELS.—H. L. Stibbs, Savannah, Ga.

First, I claim the combination of the horizontal pipe, C, bent outlet pipe, D, and cone-shaped bottomless cup, E, with each other, substantially as herein shown and described and for the purpose set forth.

Second, The combination of the shaft, G, and crank arms, F and H, with the pipe, D, and bottomless cup, E, substantially as herein shown and described and for the purpose set forth.

65,299.—CLOTHES SPRINKLER.—E. B. Taylor, South Sudbury, Mass.

I claim the reservor, A, with its pipe, B, having extension flexible tube, C, terminating in a perforated head or cap, provided with a lever, when all constructed and arranged together substantially as and for the purpose described.

65,300.—MACHINE FOR SIZING HATS, ETC.—James S. Taylor, Danbury, Conn.

First, I claim the diagonal vibrating felter, G, constructed and operating substantially as and for the purposes set forth.

Second, The mode herein described of imparting motion to the roll of goods by means of the felter, G, cranks, N, pitmans, L, and swings, H.

Third, The combination and arrangement of screws, K, sliding nuts, I, and swings, H, substantially as described, for the purpose of regulating the pressure of the felter.

Fourth, The felter, G, in combination with two or more rollers, C, substantially as and for the purposes set forth.

65,301.—COMPOUND FOR COATING OILCLOTHS, ETC.—John L. Tenney and John W. Bailey, Skowhegan, Me.

We claim the use of ground slate and clay when compounded in or about the proportions set forth and used in the manner and for the purpose described.

65,302.—MEDICAL COMPOUND.—James P. and Lemuel Thurmon, Warrenton, Mo.

We claim the improved medical composition produced substantially with the ingredients mixed together in or about the proportions stated, in combination and in mixture with the medical compound herein referred to.

65,303.—WOOD SPLITTING MACHINE.—Leonard Tilton, Brooklyn, E. D., N. Y.

First, I claim the two reciprocating cutters, G G1, of V form, placed one above the other in reverse positions and the lower cutter, G1, in advance of the upper one, G, substantially as and for the purpose set forth.

Second, The hopper, H, in combination with the cutters, G G1, and the holder, K, substantially as and for the purpose specified.

Third, Operating the holder, K, from the slide, F, to which the cutters are attached by means of the rod, L, connected with the slide as shown, and the spring, N, as set forth.

Fourth, Constructing the hopper, H, of the vertical parts, f f', one of which, f, is adjustable for the purpose of adapting the hopper to suit the length of the sticks to be split, as shown and described.

65,304.—DEVICE FOR TRANSMITTING MOTION.—Leonard Tilton, Brooklyn, N. Y.

I claim the cam, D, and bar, Q, in combination with the pulleys, F I J, gearing, H C c' c E, belt, H, and belt shipper composed of the arms, N N', arranged and operated automatically from the bar, Q, substantially in the manner as and for the purpose herein set forth.

65,305.—CLOTHES DRYER.—S. H. Titus, Pennington, N. J.

I claim the combination and construction of a clothes horse having the cross standards, A B and C D, parallel arms, E F G H E I and F H, roller, L L, and belts, M M, ratchet, N, spring catch, P, and thumb head, O, with the clothes bars, K K K, substantially as above described and for the purposes herein set forth.

65,306.—FINISHING IRON WORK OF PLOWS, STOVES, PIPES, LEVEES, DAMS, ETC.—S. P. Townsend, Union Co., N. J.

First, I claim the finishing of plows, iron work for levees, dams, etc., piling, and other iron and steel work known mentioned, substantially as described and for the purpose set forth.

Second, The restoration to good condition by the means described of iron and steel work which has been damaged by oxidation or corrosion.

Third, A new article of sheet piling made substantially as described and for the purpose set forth.

65,307.—HOISTING MACHINE.—J. W. Tucker, New York City.

First, I claim the arrangement of the pulleys, d e f, and bifurcated chains, F, in relation with each other and with the platform, C, and winding drums, E, substantially as herein set forth for the purpose specified.

Second, The locking dog, J, and sliding shaft, I, combined in relation with each other and with the gearing which operates to elevate the platform, C, substantially as and for the purpose set forth.

Third, The friction brake, K, and pulley, l, arranged with reference to each other and with the sliding shaft, i, and the gearing which operates to raise the platform, C, substantially as herein described for the purpose specified.

65,308.—WOOD PLANING MACHINE.—Wm. Tucker, Paris, Ill.

I claim the arrangement of the double cutter head, E, and friction pullies, K L L', capable of being simultaneously shifted for right or left hand cutting, substantially as set forth.

65,309.—BRAIDING MACHINE.—William Tunstill, Paterson, N. J.

First, I claim the case, p, fitted upon the carrier, d, in a braiding machine and containing the bobbin or cop from which the thread passes off upon the line or nearly so of the axis of said bobbin or cop, substantially as and for the purposes set forth.

Second, I claim the ratchet pulley, q, over which the thread passes pawl, 2, and finger, 6, in combination with the weight, r, substantially as and for the purposes specified.

Third, I claim the grooved ratchet wheel, q, over which the thread passes, pawl, 2, and weight, r, in combination with the cop or bobbin, p' substantially as and for the purposes specified.

Fourth, I claim friction wheel applied in substantially the manner specified between the driving pulley, k, and the main shaft, l, of a braiding machine in combination with the stopping and starting mechanism so that the machine may commence to move gradually instead of suddenly as set forth.

65,310.—CAR COUPLING.—Edward A. Turner (assignor to himself and John Morrissey), New York City.

I claim the coupling link, C, furnished near one end with the laterally projecting ears or lugs, b, in combination with the draw head, A, and a suitable coupling pin, substantially as herein set forth for the purpose specified.

65,311.—WAGON BRAKE LOCK.—Thomas Urie, Springfield, Iowa.

I claim the eccentric, e, in combination with the rod, d, the slotted lever, s, and the segment plate, b, for locking a wagon brake by means of the connecting rod, g, constructed, arranged and operating substantially as and for the purposes described.

65,312.—ROTARY STEAM ENGINE.—John H. Van Sandt and J. J. Hurt, Princeton, Ind.

We claim the arrangement of the cams, G, springs, g, valves, F, with reference to the system of cranks, e, connections leading from the shaft, L, substantially for the purpose specified.

65,313.—COMPOSITION FOR FILTERING PETROLEUM SIRUP AND OTHER LIQUIDS.—William V. Wyck, Belleville, N. J.

I claim the application of the above mentioned compound of soluble animal matter chalk and wood charcoal for the purification of petroleum and other oils, sugars, syrups and molasses and spirituous liquors by filtering these substances through the above mentioned compound or by any mode equivalent to filtration.

65,314.—PHOTOGRAPHIC CAMERAS.—George W. Venner, Charlestown, Mass. Antedated May 15, 1867.

First, I claim the compound sliding frame, M and J, made substantially as described and for the purpose set forth.

Second, The method of operating the said sliding frames, M and J, by means of the bar, H, oiler, I, caps, c c, or their mechanical equivalent and the lower part of the adjusting board, C.

Third, The folding screws, d d', substantially as described and for the purpose set forth.

65,315.—BUTTER WORKER.—S. H. Wade, Montgomery Center, Vt.

First, I claim the combination of the pressers, E, sliding beam, G, and operating levers, H and J, with each other and with the frame of the machine, substantially as herein shown and described and for the purpose set forth.

Second, The combination of the pivoted table, D, and sliding frame, B, with each other and with the frame of the machine, substantially as herein shown and described and for the purpose set forth.

65,316.—DEVICE FOR UNLOADING AND STACKING HAY.—William R. Waldron, Webster, Mich.

I claim the combination of the poles, pullies, rope and anchorage when arranged substantially as herein described and for the purposes herein set forth.

65,317.—CARRIAGE SHACKLE.—F. M. Weller, Evanston, Ill. Antedated May 16, 1867.

I claim the carriage shackle constructed and operating substantially as described and specified.

65,318.—CAR SEAT.—Jesse S. Wheat, South Wheeling, W. Va.

First, I claim the cross head arms D, and slotted links c, in combination with the back of the seat C, and the ends A, arranged and operating substantially as and for the purposes herein described.

Second, The double inclined racks E, in combination with the guide plates c, arranged and operating as and for the purposes specified.

65,319.—MACHINE FOR CLEANING FLAX.—W. W. Whiddit.—Richmond, Ind.

First, I claim constructing a machine for cleaning flax, etc., with a door L, or its equivalent by which said machine is closed and the material confined until cleaned substantially as set forth.

Second, The octogonal shaped cylinder I, having flanged ends substantially as described and for the purpose specified.

Third, The reversible hopper B, operating on journals substantially as specified.

Forth, The arrangement and joint operation of hopper B, and door L, substantially as set forth.

Fifth, Loose pully c, provided with pin n, and lug o, or their equivalents, wheel D, either with or without teeth, provided with cam S, the latter either permanently attached or adjustable, in combination with slide P, detent T, and device W, all arranged substantially as set forth and for the purposes specified

65,320.—APPARATUS FOR COOLING LIQUIDS ON DRAUGHT.—Edward Whyte, Philadelphia, Pa.

I claim a cooler covered with felt ice-chamber, as described, opening a block B, and cylinders C, constructed and operating substantially as specified.

65,321.—COMPOSITION TO BE USED AS PUTTY FOR STONE WORK.—John R. William, Taunton, Mass.

I claim the improved composition of matter herein described for the purpose specified.

65,322.—LAMP BURNER.—John B. Wortham, Huntsville, Ala.

1st, I claim the ventilating collar or cylinder, c, constructed and operated and for the purposes substantially as herein set forth.

2d, In combination with the cylinder, c, the toothed edge of the plate, b, or its equivalent.

3d, The plates, i and j, for holding the cap open, as described.

65,323.—TANNING.—Francis H. Wright (assignor to himself, William C. Slade, and B. M. Pratt), Richmond, Ind.

I claim the use of the proportion of ingredients named in formulæ A and B, and the manner of applying the same to hides, furs, and skins, for the purpose of tanning the same rapidly and effectually.

64,824.—CORN HARVESTER.—John Wright and J. J. Johnson, Cold Water, Mich.

1st, We claim the arrangement of the knives, B B, with double or oblique motion, operated with slotted guides, or their equivalent, in combination with the stationary knives, A A, substantially in the manner and for the purposes herein set forth.

2d, The tilting platform, K, in combination with the stationary platforms, F F, the spring curved arms, M M, and spring catch, L, or its equivalent, substantially in the manner and for the purpose as herein described.

3d, The cutting knives, as arranged and operated in combination with the tilting platform, substantially in the manner and for the purpose as herein described.

65,325.—MACHINE FOR CUTTING OFF CIGARS.—P. Zern and W. Warwick, Pittsburg, Pa.

We claim the combination of the upright, B, with opening C, and plate, E, having similar openings, when the two are arranged and combined together substantially as and for the purpose described.

REISSUES.

2,622.—MACHINE FOR MAKING SEINE NETS.—William C. Hooper & Sons, Baltimore, Md., assignees of Benjamin Arnold. Patented Sept. 23, 1862. Antedated Aug. 3, 1860.

First, We claim the arrangement and combination substantially as described of the various implements employed in forming a loop, viz.: the bar, m', with the row of guides, c c c, and the bars, l and o, with their pins.

Second, We claim the bar, Y, with its double row of pins, for the purpose of holding the netting, as set forth and when constructed substantially as described.

Third, We claim the combination of the regulating screw or screws, i" i", with the levers, d" d" and V', for the purpose set forth when arranged substantially as described.

4th, We claim the carriage, j, with the rows of bars, a a, in combination with the raceways, S S', and thread carriers, a' a', when arranged substantially as described for the purpose set forth.

5th, We claim the toggle levers, H' H', for the purpose of drawing up the knot, substantially as herein described.

5th, We claim a machine constructed and operating substantially as described herein for making nets or netting.

2,623.—OPAQUE PIGMENT.—D. L. Bartlett and G. H. Hunt, Baltimore, Md., assignees of Stuart Gwynn. Patented Dec. 19, 1865. Antedated Dec. 5, 1865. (DIV. A.)

We claim opaque pigments made from any article whose normal atoms or molecules or particles have been crushed by pressure after having been purified, substantially as herein set forth.

2,624.—MANUFACTURE OF OPAQUE PIGMENTS.—D. L. Bartlett and G. H. Hunt, Baltimore, Md., assignees of Stuart Gwynn. Patented Dec. 19, 1865. Antedated Dec. 5, 1865. (Div. B.)

We claim the process of manufacturing opaque pigments by crushing and pulverizing the normal atoms or molecules, substantially as herein described.

2,625.—HARVESTER.—J. W. Bope, St. Louis, Mo. Patented Jan. 17, 1865.

First, I claim a tilting platform turning upon a pivot in rear of its forward edge and connected to the main frame of the machine through the medium of the finger bar only.

Second, A tilting platform having a fixed pivotal bearing at its outer or grain end and in rear of its forward edge in an arm or support which is attached to the finger bar and has no rear support from or connection with the main frame.

Third, A tilting platform vibrating upon a fixed pivot in rear of its forward edge in combination with the cutting apparatus and main frame in such manner as to leave an unobstructed space in rear of said platform for the delivery of the grain upon the ground.

Fourth, A cut-off for separating the falling grain from the completed gavel on the platform interposed by the tilting of the main platform upon a fixed point or pivot in rear of its forward edge.

Fifth, A platform which discharges the gavels by turning upon a pivot in rear of its forward edge in combination with the laterally projecting cutting apparatus of a two-wheel side draft machine.

Sixth, The combination in a two-wheel side draft machine of an adjustable cutting apparatus, a tilting platform connected thereto and turning upon a pivot in rear of its forward edge, and a lifting mechanism in such manner as that said cutting apparatus and platform can be raised for passing obstructions while the machine is in motion.

Seventh, Operating the tilting platform by means of the lever and the chain or cord, in the manner as and for the purpose herein described.

Eighth, The employment of a shield or guard for closing the opening between the finger bar and forward edge of the platform formed by the tilting of the platform on a pivot in rear of its forward edge.

2,626.—PICKER-STAFF MOTION FOR LOOMS.—Edmund H. Graham, Manchester, Mass., and Wanton Rouse, Taunton, Mass., assignees of Edmund H. Graham. Patented Oct. 16, 1860. Reissued Oct. 2, 1866.

We claim, First, The combination of a rocker of a picker staff with its bed by loose journals projecting each side of the picker staff and arranged beneath the picker staff, substantially as described.

Second, In combination with the rocker, the bed, and the journals the open boxes, substantially as and for the purpose described.

Third, In combination with the rocker and its bed the journal bearing arm, operating substantially as and for the purpose specified.

2,627.—PICKER-STAFF MOTION FOR LOOMS.—The Amoskeag Manufacturing Company, Manchester, N. H., assignees of Nehemiah S. Bean. Patented Jan. 22, 1866.

We claim the improved arrangement of the rocker, b, the link, c, and the support piece, e.

Also the arrangement of the spring, f, with the support piece, e, the link, c, and the rocker, b.

Also the arrangement of the cars, g, with the link, c, the support piece, e, and the rocker, b, the whole being substantially as specified.

2,628.—GENERATING GAS AND OBTAINING OTHER USEFUL PRODUCTS FROM ANIMAL AND VEGETABLE MATERIALS.—Thomas D. Ledyard, Toronto, Canada, assignee by mesne assignments of J. J. Ensley. Patented Aug. 28, 1866.

I claim making a compound gas by the mixture in proper proportions of gas made from wood or other vegetable matter with gas made from bones or other animal matter, substantially as and for the purpose herein specified.

I also claim the combination of the perforated charge cylinder or vessel, d, open at the inner end and the horizontal close retort cylinder or csamber, c, substantially as and for the purpose herein specified.

I also claim the vapor condensing vessels or chambers, k k, connected by the pipes, l l, and provided with discharge cocks, m m, when used in combination with the inclosing water tank, B, substantially as described.

I also claim the combination and arrangement of the tight vessel or chamber, q, and pipes, r r, with the pipe, n, for the purpose of pumping off the condensed water which gathers therein without admitting air or allowing escape of gas, substantially as set forth.

2,629.—DESULPHURIZING COAL AND ORES.—Jacob J. Storer, Boston, Mass. Patented April 9, 1861.

First, I claim the process substantially as described of forcing into the interstices of coal containing sulphurous impurities by the pressure of steam and either dissolved in it or mechanically conveyed by it chemicals proper to neutralize the sulphurous impurities.

Second, The employment of salts of ammonia forced by pressure of steam into the interstices of coals, as and for the purpose described.

2,630.—ATTACHING LABELS TO BOTTLES.—Elma E. Walton Newark, N. J., assignee by mesne assignments of Wm. N. Walton. Patented Sept. 23, 1862. (Div. A.)

First, I claim shaping the bottle whether in intaglio or in relievo so as to form a seat for and protect the label or inscription plate, substantially as and for the purposes set forth.

Second, The arrangement of the lip or ridge, a, whether distinct from or forming a part of the recess or seat for the label plate for preventing fluids, etc., entering or passing between the inscription plate and bottle, for the purposes set forth.

2,631.—BOTTLE FOR DRUGGISTS AND CHEMISTS.—Elma E. Walton, Newark, N. J., assignee by mesne assignments of Wm. N. Walton. Patented Sept. 23, 1862. (Div. B.)

I claim a bottle formed with a recess or seat for a label whether in intaglio or in relievo and having secured therein by cement or other suitable substance a label with a glass or transparent label or inscription plate, as a new and improved article of manufacture.

2,632.—HARVESTER.—Cyrenus Wheeler, Jr., Auburn, N. Y. Patented Feb. 6, 1855. Reissued June 5, 1860.

First, I claim the combination of a vibrating frame, a finger bar attached to one corner or end thereof by a hinge, and a platform in the rear of said finger bar so as to leave an unobstructed space for the delivering of the grain on to the ground.

Second, The combination of a vibrating frame with the cutting apparatus hinged thereto, a driver's seat and an arrangement of one or more levers whereby the driver in his seat can raise and sustain the cutting apparatus when desired.

Third, The combination of a finger bar hinged to a vibrating frame and a removable platform connected with the said frame by means of the finger bar only.

Fourth, The combination of a hinged finger beam and a side delivery platform so arranged that the grain may be delivered from the platform on to the ground out of the way of the horses or their next round.

Fifth, The combination of a hinged finger beam, a lever and a yielding or linked connection extending from the lever to the vibrating part of the machine to which the finger beam is attached, whereby the inner end of the finger beam is raised to pass obstacles in mowing and raised and sustained in reaping.

Sixth, The combination of a hinged finger beam, a lever, a yielding or linked connection extending from the lever to the vibrating part of the machine to which the finger beam is attached and the seat for the driver, whereby the driver can raise the inner end of the finger beam to pass obstacles in mowing and raised and sustained the same in reaping.

Seventh, The combination of a hinged finger beam with an auxiliary draft rod or bar attached to the inner end of the hinged finger bar.

Eighth, The platform bar, Q, as a means of securing the platform to the finger beam and for strengthening said finger beam when it has the platform to carry, substantially as described.

Ninth, The inclined caster wheel, S, arranged as represented and in combination with the platform, whereby the latter is elevated when the machine is being turned short around to the right, substantially as described.

Tenth, In combination with a finger beam and platform placed in rear of the main supporting wheel, the two casters, N S, arranged as described for allowing the machine to turn short around to the right, for the purposes specified.

Eleventh, A revolving track clearer when operated from a ground wheel through gearing, substantially as described.

DESIGNS.

2,659.—BOTTLE AND CAP.—Robert B. Parkinson, Philadelphia, Pa.

2,660.—HEEL PLATE FOR BOOTS, ETC.—Franklin Shaw, Braintree, Mass.

SIXTY-ONE patents reported in the above list were solicited through the Scientific American Patent Agency.—EDS.

Inventions Patented in England by Americans.

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

PROVISIONAL PROTECTION FOR SIX MONTHS.

659.—COATING PAPER AND OTHER MATERIALS WITH FLUID SUBSTANCES SOLUTIONS AND COMPOUNDS FOR PHOTOGRAPHIC AND OTHER PURPOSES.—John C. Crossman, Boston, Mass. March 8, 1867.

956.—HANGING SHIPS' RUDDERS.—Henry H. Pember and Uriah E. Rogers, New York City. March 30, 1867.

1,150.—BREWERS' MASH TUNS.—James Walker, Cincinnati, Ohio. April 20, 1867.

1,162.—COTTON BALE TIE.—Henry Fassmann, New Orleans, La. April 20, 1867

1,178.—MODE OF AND APPARATUS FOR REMOVING THE CONTENTS FROM CENTRIFUGAL SUGAR MACHINES.—Helem Merrill, New York City. April 23, 1867.

1,186.—SEWING MACHINE.—Lewis B. Bruen, New York City. April 24, 1867.

1,196.—CONSTRUCTION OF KNIVES, FORKS, AND OTHER IMPLEMENTS OF CUTLERY.—George Parr, Buffalo, N. Y. April 25, 1867.

1,202.—SELF-ACTING TACKLE HOOK.—Charles Luxton, Hudson, N. J. April 25, 1867.

1,256.—MANUFACTURE OF BOOTS AND SHOES, ETC.—Thomas B. Smith, Boston, Mass. May 1, 1867.

1,313.—BINDERS FOR PAPERS, ETC., WHICH ALLOW THE WHOLE OR PARTS OF THE CONTENTS TO BE REMOVED OR EXCHANGED.—Noah M. Shafer, New York City. May 4, 1867.

1,340.—MACHINERY FOR MAKING ROVING AND FOR SPINNING INTO YARN.—Albert H. Gilman, Boston, Mass. May 7, 1867.

1,348.—HYDRAULIC VALVE GEAR FOR STEAM AND ANALOGOUS ENGINES.—Norman W. Wheeler, Brooklyn, N. Y. May 7, 1867.

1,349.—SKYLIGHTS AND VENTILATORS, AND SHAFT COUPLINGS FOR STEAM VESSELS.—Norman W. Wheeler, Brooklyn, N. Y. May 7, 1867.

1,350.—CONSTRUCTION AND PACKING OF SLIDE VALVE AND ADJACENT PARTS FOR STEAM AND OTHER ENGINES.—Norman W. Wheeler, Brooklyn, N. Y. May 7, 1867.

1,351.—APPARATUS FOR INTRODUCING AND CONTROLLING THE INTRODUCTION OF FLUIDS TO SURFACE CONDENSERS OF STEAM ENGINES.—Norman W. Wheeler, Brooklyn, N. Y. May 7, 1867.

EXTENSION NOTICE.

Daniel Noyes, of Ablington, Mass, having petitioned for the extension of a patent granted to him the 25th day of October, 1853, for an improvement in machine hammers, for seven years from the expiration of said patent, which takes place on the 25th day of October, 1867, it is ordered that the said petition be heard at the Patent Office on Monday, the 7th day of October next.

Zur Beachtung für Deutsche Erfinder.

Nach dem neuen Patent-Gesetze der Vereinigten Staaten, können Deutsche, sowie Bürger aller Länder mit einer einzigen Ausnahme, Patente zu denselben Bedingungen erlangen, wie Bürger der Ver. Staaten. —

Erkundigungen über die, zur Erlangung von Patenten nöthigen Schritte, können in deutscher Sprache schriftlich an uns gerichtet werden und Erfinder welche persönlich nach unserer Office kommen, werden von Deutschen prompt bedient werden. Man adressire

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VANS LANDIS & Co., 211 Market street, Philadelphia, Pa.
D. D. SWEET & Co., 66 Canal street, Providence, R. I.
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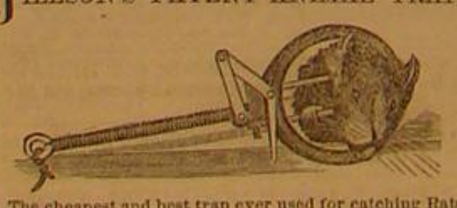
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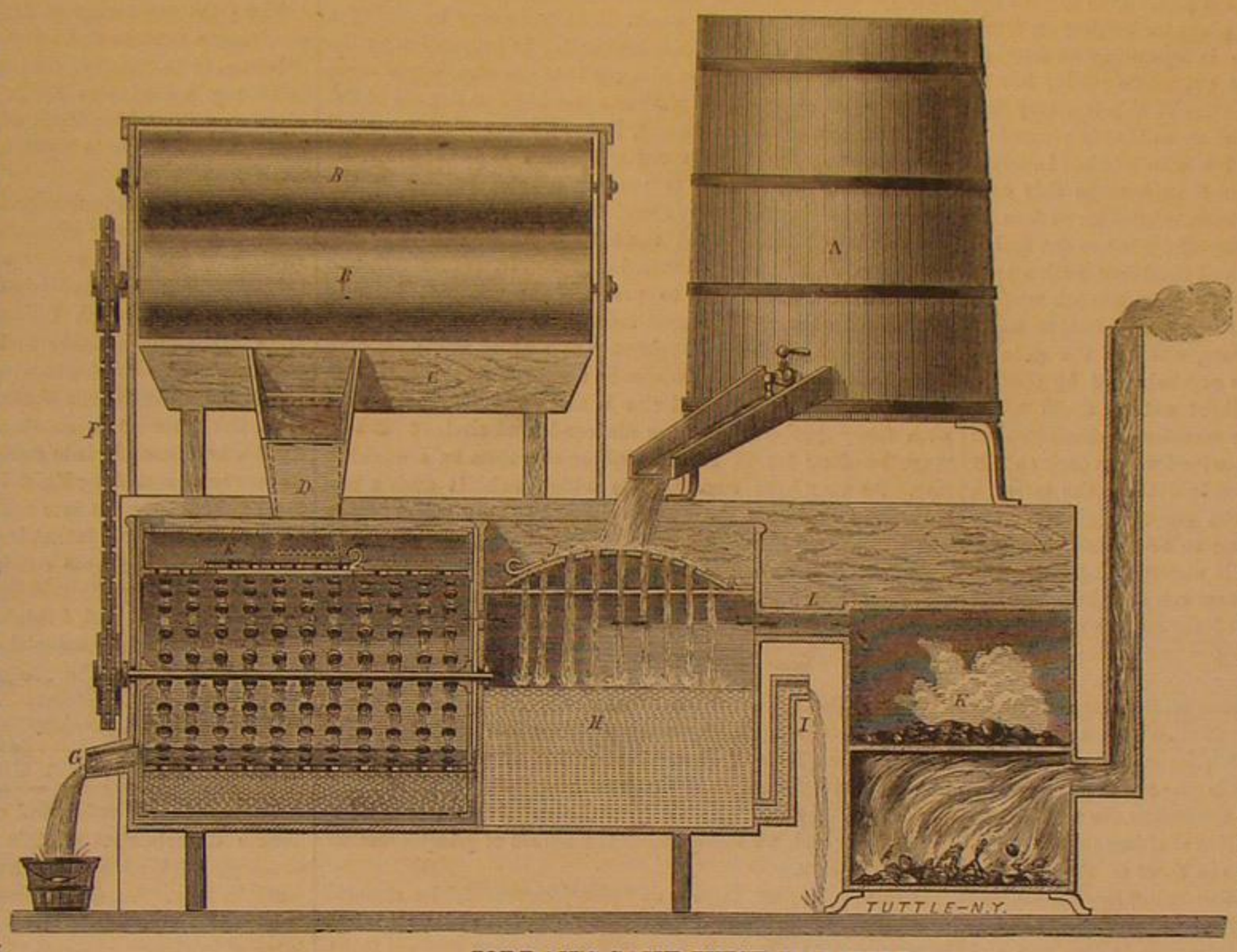
Vol. XVI.—No. 25. [NEW SERIES.]

NEW YORK, JUNE 22, 1867.

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Improved Method of Clarifying Saccharine Sirup.

The clarifying of the juice of cane and other vegetable substances which is to be manufactured into sirups and sugars is, in a commercial point of view, very important. The engravings represent an apparatus for doing this by chemical means which are at once simple, cheap, and effective. A description of the parts will enable any one to understand its construction and operation. On an elevated platform is a water tank, A, and the rollers, B, for expressing the juice. Under the rollers is a trough, C, from which leads a spout or conduit, D, to conduct the juice to the juice receptacle, E, in which revolves a perforated cylinder, having curved radial buckets on its circumference, by which means the juice is constantly stirred and lifted, and which is rotated by means of a shaft and the chain, F, leading from the rollers or from any other source of power. The juice is discharged at G, and the receptacle, E, has an air tight cover. H is the purifying box filled to the level of the pipe, I, with water, which is received through a convex perforated cover, J, from the tank, A. By means of the incline of this cover and its minute perforations the water descends into the purifying box in a shower or spray. The oven, K, holds a quantity of sulphur heated by a fire beneath, the fumes or vapors of which pass in the direction of the arrows through the connecting pipe, L, into the purifying chamber where they are cleansed from impurities, and thence into the receptacle, E, by apertures in the heads of the cylinder where they mix intimately with the agitated particles of the juice and finally escape into the atmosphere through the spout, G. A sliding opening over the cylinder in E and a faucet at the bottom offer facilities for cleaning, as also does the hinged air tight cover of E and that of H, also hinged.



JORDAN'S CANE JUICE PURIFIER.

This simple apparatus has been in use in Louisiana for over two years with perfect s uccess, the products of the plantations where it was employed bringing a price above the highest market figure, the molassses itself being equal to what is called the "golden sirup." It is cheap and easily applied to ordinary mills, requiring no attendant but the engineer or firemen and using but about ten per cent of the amount of sulphur formerly used in other machines. It purifies the sulphur before its vapors come in contact with the cane juice, preventing clamminess or gumming, which hinders a free granulation of the sugar; thus purified it is ready to absorb all the impurities of the juice while it has none of its own to give, leaving the juice to pass into the receiver ready for the kettles. The fuel necessary to heat the sulphur is so little that its cost is hardly worthy mention. The apparatus is as well adapted to maple sap and the juice of sorghum or beets as to that of the cane.

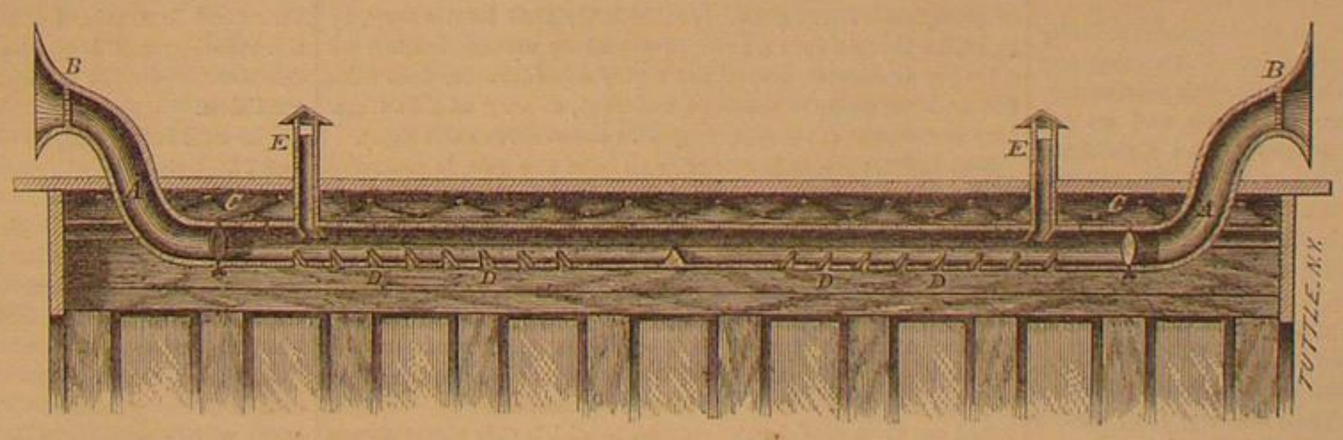
Last patent on improvements dated April 2, 1867, issued to William A. Jordan, of New Orleans. For all information required apply to H. G. Heartt, 29 Commercial Place, New Orleans, La. [See advertisement on another page.]

Graves' Ventilating Apparatus.

This invention relates to devices for ventilating railroad cars, vessels, vehicles, public buildings, dwellings, etc., and consists of one or more metal or other pipes having openings at their ends for the admission of pure air and the emission of foul air. The engraving is a view of the top of a railway car with one ventilating pipe *in situ*. A is a tube running along under the roof of the car, the ends projecting through the roof and having bell mouths, the interior of which are guarded by diaphragms of fine wire gauze, seen at B, for arresting dust, sparks, and other suspended impurities. Dampers or valves, C, are placed at either end for regulating and controlling the passage of the air. At the middle of the pipe is a wedge-shaped partition which rises from the lower side to above the center of the tube's diameter. On each side of this is a series of crescent shaped openings, D, in the bottom of the tube, furnished with deflectors placed in an inclined position toward either end of the pipe. E E represent vertical pipes passing through the roof, having ventilating cowls on their tops, and the portion extending into the horizontal pipe being inclined toward the deflectors, D. These vertical pipes are supplementary outlets for the foul air.

The operation is simple. It will be seen that which ever end of the car may be going forward the external air rushes into the bell mouth, and being deflected downward by the guides, D, enters the car and drives out and replaces the foul air, which escapes through the openings, D, on the other side of the central partition and of the mouth, B, or the pipe E. A portion of the air received in the front end of the pipe will continue its passage over the central partition and assist by its current in producing additional draft to expel the foul air from the car.

As applied to buildings this apparatus may be a straight



GRAVES' VENTILATING APPARATUS,

instead of a curved pipe, and also in those cars which have a raised roof or skylight. In vessels it could be so applied that the end openings could be raised high enough to keep out the water. It would seem to be well adapted to our monitors, at least as an auxiliary to the fan driven by steam. It could be attached to cars, churches, and other places of public resort near the floor or at any desired hight, as well as near the ceiling.

The apparatus appears to be constructed on scientific principles and calculated to serve a very useful purpose. It was patented through the Scientific American Patent Agency April 16, 1867, by Robert C. Graves, Barnesville, Ohio, who may be addressed by all interested in the subject.

The Pneumatic Dispatch.

At a recent meeting of the Association for the advancement of Science and Art, in the Cooper Institute, New York City, Dr. Gilbert delivered a lecture on atmospheric railways, and their utility in facilitating locomotion, the transmission of letters and the transportation of goods, especially in large cities. He first made some observations on the properties of air, demonstrating its weight—a column of air between forty and fifty miles high being equal to a column of water thirty-two feet, or of mercury twenty-eight to thirty inches in hight. He showed also the effects of the expansion of air, and explained how some of these properties are applied in the construction of atmospheric railroads.

In principle, an atmospheric railroad consists of an exhausted tube or tunnel through which the car or carriage is forced by expansion of the air. The idea of employing air as a motive power in this manner is not new. Many years ago it was proposed, but owing to numerous difficulties arising from the unprepared state of the public mind, and from other causes, the project was not carried into effect. Later still, atmospheric railways were constructed in England. Of these there are two forms. In one the carriage runs in a tunnel the entire way from one station to another. At one end of this tunnel there is an engine which exhausts the air, and produces thereby the motion of the carriage. To make the carriage fit into the tunnel as closely as possible, there is attached to it a diaphragm made of india-rubber, with bristles appended. An example of this kind of railroad is exhibited in the Crystal Palace at Sydenham.

Another form is that in which the cars move in the open air, and are drawn by a piston passing into a tube which lies by the side of the track. This is the plan of the Dalkey and Kingstown railroad, near Dublin. It long since proved a failure, as owing to the arrangement of the valves in the tube, considerable leakage occurs.

On the former plan, Mr. Needham, an American, has improved. He arranges the tunnel in the form of an irregular ellipse, and placing in the circumference a powerful air-pump he exhausts the air from one arm, when that in the other arm rushing in, forces the car forward. It was shown how, by valves and a connecting pipe, the carriage might be stopped at any point without interrupting the action of the air.

To prove the necessity of this railroad as a means of locomotion in cities, the lecturer showed how desirable it was as a sanitary measure that hard workingmen should have the means of going out into the country after their day's work, without losing time by traveling in inconvenient street cars. By means of this railway they could pass from the Battery to the Central Park in about four minutes. In fact the rate of speed attainable without inconvenience was at least twice that of the English express trains, which run at the rate of sixty miles an hour. It would be also a matter of importance to the merchant and to the whole community, to whom time is of so much value. That something is nesessary to relieve the increasing transportation of New York and the suburbs, he considered evident from the fact that at least five hundred thousand parcels are daily carried in this and the adjacent cities.

As a means of collecting and delivering letters, he considered that the Pneumatic Dispatch possessed unusual advantages. It has been found to work well in London, where mail bags, etc., are drawn by it round curves and up and down hill, with great economy. It is proposed that the letters be droped into lamp-post boxes, from which they are automtically withdrawn by the pneumatic car in its passage. By an ingenious contrivance the letters may be dropped at certain places without stopping, and may be collected at all stations and lamp-posts below Forty-second street, and delivered at the post-office in six minutes.

Special Correspondence of the Scientific American.

MACHINE TOOLS IN THE EXPOSITION.

PARIS, May 14, 1867.

AMERICAN MACHINE TOOLS.

The display of machine tools for metal working in the Exhibition is large, and includes quite a number of considerable novelty of design. The Americans as is so frequently the case, are able to lay claim to the greatest amount of originality in what they have brought forward, but it is not always easy to assert that their designs are decided improvements on the usual British types of machines. Messrs. Wm. Sellers & Co. have much the largest number of tools among American firms, and their tools do no little credit to our native skill. They have not unnaturally endeavored to send tools of as unusual design as possible, and on that account they attract considerable attention. The largest tool exhibited by this firm is a planing machine in which the bed is stationary and the upright framing moves along over the work. The vertical sides at the sides of the frame are provided with tool heads as well as the cross frame, so that two and sometimes three faces may be planed at once. The belt is carried on two fixed pullies, and passes around the one which is attached to the frame of the machine on its way from one to the other. The position, therefore, of the movable pulley makes no difference in the length or tension of the belt. It is easy to see the facility which a stationary bed gives for bolting on fresh pieces of work while the machine is operating on another portion of the table, thus of course preventing delay in setting and removing the work, and no doubt this is a very important advantage. The economy of room that is secured is also equally evident, but there are few who will not involuntarily feel that a moving frame, even though as in this case furnished with a good length of base, cannot be as firm as one bolted fast to the foundations, especially when the tool is working near the top of the frame and therefore with a very considerable leverage, acting in any case on a much smaller base than that which the ordinary sliding table has, to resist jar. It may be questioned, therefore, whether the gain of time in setting work would not be overbalanced by the necessity for taking a comparatively light cut to avoid trembling. Another novelty is a planing machine of much smaller dimensions, in which the table is provided with a rack as if it were to be driven by a pinion, but instead of the latter, a coarse threaded screw inclined at the proper angle with the center line of the machine, according to the pitch, is substituted as the motor. The reader will observe that from the nature of the surfaces in contact there can only be a bearing at any one instant on a single line of the surface of either of the screw or rack, and whether the power of the parts to resist would be as great as where the rubbing is extended over a much greater surface, as in the case of the screw working in a nut, or as where little rubbing at all occurs, as with the rack and pinion, is a matter on which he can form his own opinion. The driving pulleys for this planer are so placed by means of bevel gearing as to bring the bed of the machine in the same direction relatively to the line shafting as the lathes, instead of at right angles to it, as in those of the ordinary construction. An example of his bolt-cutting machine is also exhibited, and the best praise that can be given to this machine is to notice how extensively it is used in England and how it has been copied by continental makers. A considerable number of Seller's patent self-adjusting injectors are also exhibited. One being cut open on one side so as to display the construction and mode of operation of the instrument. Mr Sellers also exhibits a gear-cutting machine, a self-acting steam hammer of small size, and other tools and portions of machinery, all of considerable merit. Messrs. Bement & Dougherty are also represented in the Exhibition. One of their tools is a fine horizontal boring machine, a tool well known I believe in America.

OTHER ENGLISH TOOLS.

The tools in the English department are models of solidity of design and excellence of workmanship. If there is any one branch of engineering in which the English particularly excel, it is in the construction of machine tools, and no one can walk through the machinery gallery of the Exhibition without being impressed with the superior judgment evidenced in the proportions of these tools compared with those by foreign makers. Messrs. Sharp, Stewart & Co., of Manchester, send a number of substantial tools, such as lathes, shaping machines and slotting drills, which show good design and careful workmanship. There is a good driving wheel lathe with two face plates and four tool posts, two on each side of the lathe, so that a double cut may be taken on the tires of both wheels at once. Their slotting drill differs from that made in America by Messrs. Bement & Dougherty and obtained by them from Mr. Shanks in Scotland, in that but one drill is used, and the work must therefore proceed more slowly. The tool is arranged quite differently from the other referred to, the drill in this case working vertically. Then there is that admirable tool so common in England, the radial drill. It saves an immense amount of time in drilling holes in large pieces of machinery, and has the additional advantage that it may be used for boring and work for which movable cranes such as are in use with us for similar purposes would be wholly inadequate. Why have not some of our tool makers brought it out in America?

WHITWORTH'S MACHINERY.

But if we wish to see perfection of design and execution we must pass on to the space allotted to Mr. Whitworth. Of course it is easy to praise what is already acknowledged to be of merit but the verdict in favor of these tools is unavoidable. It seems impossible to designate a single part as either too light or too heavy, a bearing as too large or too small, or a surface as too little or too carefully scraped. Every thing that is done shows mature consideration, and no labor is wasted on unimportant parts. Among the turning lathes which he exhibits is one without any spindle at all, the work being held between two ordinary centers and rotated by a driver placed near the middle of the length of the lathe. This is a revolving drum through which the work passes, the outer edge being provided with teeth for receiving the motion of the driving pinion. Two slide rests are used, one on each side of the driver. Another interesting tool is a special one designed for planing the faces of the hexagonal shot used in Mr. Whitworth's system of ordnance. Its construction is very similar to that of an ordinary planing machine, but the sliding table is replaced by a sliding spindle to which the shot is secured, and which has six spiral grooves cut in its surface, which give it a rotary motion as it moves forward through its bearings. Three tools are used, one above and one on each side of the upright frame, and the clutch—if so it may be called—by which the shot is held, is provided with notches properly distanced, so that the other faces may be brought properly under the action of the tools. A very simple planing machine with Whitworth's patent revolving tool holder, by which a cut is taken when the bed is in motion in either direction, is exhibited, and also a radial drill of the pattern turned out at these works. This is a simpler and more neatly designed tool than that by Messrs. Sharp, Stewart & Co., and is a beautiful specimen of work. The same may be said of a small foot lathe which stands beside it. In proportion as the surfaces become smaller we observe that the scraping is more carefully done, and this tool shows the highest degree of finish. The motion of the treadle, in accordance with the usual custom of these makers, is communicated to the crank shaft of the lathe by chain belts passing around pullies in the frame of the treadle. Three surface plates are also exhibited, and this may be considered the most suggestive part of the collection, as it is to this invention that Mr. Whitworth and the world owe the means to produce the accurate bearing surfaces now required in good tools.

But what can be said of tools such as we find in the Belgian department for example, where as a substitute for scraping, the makers have disfigured the bearings of their machines with fancy patterns such as diamonds and circles? If this must be done let it be somewhere else than on a working face. As we might expect, tools which exhibit such a barbarism as this also show throughout the very worst design and workmanship. SLADE.

ON THE NATURE OF THE LATENT IMAGE IN PHOTOGRAPHY.

BY M. CAREY LEA.

When light, considered simply in reference to its illuminating power, falls upon any substance, we are accustomed to consider the effects of that illumination as passing away at the same instant of time that the illumination terminates. But there are a vast number of well-recognized exceptions to this rule, which we know under the names of *phosphorescence* and *fluorescence*.

If certain bodies, known as "phosphorescent," be exposed to a bright light, such as the direct rays of the sun, and then be removed to the dark, they will emit a very distinct light. This light continues to be emitted for a time of variable duration. With some substances it continues for days, with others it terminates in a few hours. Becquerel has enormously extended the number of substances that act in this way, by showing that the period of time during which they phosphoresce may be exceedingly short, and so escape ordinary observation. He constructed an extremely ingenious instrument by which phosphorescence could be made evident even when it continued for but a very minute fraction of a second after the light which fell upon the substance was removed. These facts, then, embraced under the general term of phosphorescence, prove incontestably that bodies may, by light, be thrown into a state of vibratory motion, lasting for a longer or shorter, sometimes a very considerable, time after the exciting cause is removed, and that, so long as this vibratory movement continues, they will themselves emit light.

But light, such as it comes to us from the sun, is endowed with another property distinct from illumination, and which we conveniently term *actinism*. *There is not the slightest reason to doubt that bodies may be endowed with the power of being impressed by these rays, and retaining them precisely as bodies may the illuminating rays.* Herein lies the explanation of the physical or latent image. It is simply a phosphorescence of actinic rays. Once stated, the whole matter is so evident as to carry conviction with the simple statement.

Let me then explain the manner in which this phenomenon takes place with iodide of silver. Pure iodide of silver undergoes no decomposition by light when thoroughly isolated from all substances, organic and inorganic, which are capable of aiding in effecting reduction. But, if exposed to light, it continues for a certain time thereafter to retain the vibrations it received; *and just for so long as these vibrations continue, will it be instantly decomposed if brought into contact with any substance which would have caused its decomposition had the two been subjected to the action of light together.*

Iodide of silver, if exposed to light in the presence of pyrogallic acid and nitrate of silver, is reduced. If the iodide be exposed separately, it is thrown into a state precisely similar to that of a phosphorescent body, except that it continues to vibrate in unison with the actinic, instead of the illuminating rays: and so long as this condition remains, if it be brought into contact with the above-mentioned substances, the effect is the same as if they had been exposed together to ordinary light.

For this property of light I propose the name of ACTINESCENCE, a name which, though not in every respect suitable, has the great merit of indicating the parallelism of the phenomenon to that of phosphorescence.

The more we examine these phenomena, the more we shall perceive that *actinescence must*, so to speak, exist. *For different phosphorescent bodies emit light of very different colors*, showing that their respective capacities of prolonged impression are confined to rays of a certain refrangibility differing for each in each case. Now we know that the actinic influence accompanies rays of a certain refrangibility, especially the violet, the indigo, and the rays immediately beyond the visible. The permanence, therefore, of these actinic rays under suitable circumstances, is no more difficult of conception than that of any other rays—and that this permanence exists for illuminating rays is a fact which has been known and recognized for centuries.

On what, then, does the faculty of receiving a latent developable impression depend?

On the possession by the body of two properties: First, that of being decomposed when brought into contact with certain agents in the presence of light. Second, that of being able to *retain the influence* of the chemical rays, so that on being brought into contact with these agents *after* removal from the light, the same decomposition may be brought about.

The first of these properties is *sensitiveness to light*.

The second is *actinescence*.

The joint possession of the two renders a body capable of receiving a latent or physical image.

It is easy to conceive that a body may be actinescent without being sensitive to light. In fact, substances that phosphoresce with a blue light are probably actinescent also, but not being sensitive to light, they of course can form no latent image.

To this class undoubtedly belong those substances which possess the property hitherto deemed so mysterious, that of storing up chemical power after exposure to light. When this fact was first published by Niepce de St. Victor it was received almost with ridicule. But in the views here explained, this remarkable fact finds its natural place so completely that its existence would even have been anticipated, had it not already been observed.

On the other hand, substances that are merely sensitive to light when brought into contact with others, but which have no power of retaining light impressions until the decomposing agent is brought into contact with them, are likewise incapable of receiving latent images. But these capacities may exist conjointly, as we see in the case of a large number of silver compounds.

This new view will, I think, dispel all the mystery that has seemed to some to envelop the idea of a physical image, and brings all the most obscure facts of photo-chemistry into parallelism with well-understood and very simple phenomena.—*Philadelphia Photographer.*

COOPER UNION SCHOOLS.

The annual reception and commencement of the male and female departments of this institution took place on the evenings of Wednesday, Thursday, and Friday of the last week in May. On each occasion the halls were filled with a fashionable and elegant assemblage, who manifested much interest in the progress of the arts and sciences. The young ladies of the School of Design displayed some fine portrait and landscape painting, as well as some excellent pen and ink sketches, and specimens of engraving on wood not easily excelled. In the male art department were exhibited some marked specimens of drawing in perspective and architecture from the fundamental principles to the most difficult problems, some fine specimens of drawing from copy, cast, and life, and in mechanical drawing from the embryo effort of the bisection of a line to the full and complete engine.

The receipts of the institute during the past year amounted to $37,178, showing a large increase over previous years. This fund is received from the rents of offices and stores in the building, and is the main support of the institution. The trustees declare the institute to be in an excellently prosperous condition.

The number of pupils that entered the schools last year was 1,700, and the number that remained to the close of the term 710. The full course of studies of the institution requires five years for completion, when if the pupil has passed a satisfactory examination each year, he is presented with the Cooper Union Medal and a diploma to that effect. There were eight graduates this year, one of them being a lady. The night schools are under the direction of Prof. Joseph G. Fox, whose bearing toward each individual pupil is ever courteous and gentlemanly. An occasional lecture on astronomy, which seems to have become a neglected science, would prove both beneficial and interesting to the pupils of this school, as well as create an interest in one of the most noble of the natural sciences.

The reading room during the past year was visited by 260,000 persons. The number of journals and magazines on hand is 260. The library is gradually increasing in size and value, and it is the intention of the trustees ere long to make it one of general circulation.

It must be indeed gratifying to Mr. Cooper to see so full and complete a realization of his early day-dream. Here along the corridors of the hall nightly throng the growing youth of this metropolis, seeking the fountains of useful lore which this good citizen has provided for them. Conscious of his own difficulties in his youth in acquiring a scientific education, he resolved that if he ever obtained the means, those who came after him should not suffer from the same cause, and erected this institution to that end. It now stands a grand and noble monument that will ever link his name with the cause of education.

SAFETY OF IRON SHIPS.

The Council of the Institution of Naval Architects (Eng.), has rendered an elaborate report prompted by the loss of several large and superior iron steamers during a year or two past, from which we extract the material conclusions and suggestions.

1. No general rule can be laid down for adjusting the proportions of length and depth to the breadth of a ship.

2. To every design of a ship should be appended the load water line, and her scale of displacement from light to load water line. Measures should be taken to secure that this information be recorded on the ship's papers, together with outline plans marked with the proper capacity of each compartment of the hold.

3. A minimum hight of freeboard (vertical distance from the load water line to the top of upper deck) should be fixed as follows: For a ship of 32 feet beam and 160 feet long, 4 feet; 192 feet long, 5 feet; 294 feet long, 6 feet; 256 feet long, 7 feet. In case of long ships, a complete spar deck would count for its hight as freeboard. No diminution of freeboard should be allowed for a poop or forecastle.

4. Compartments should be so arranged and proportioned that any two adjacent may be placed in free communication with the sea without sinking the ship; for the obvious reason that breakage may occur across the partitioning bulkhead, opening two adjacent compartments simultaneously. Transverse and longitudinal bulkheads, coal bunkers, iron lower decks, and screw alley, should all be so connected with the hull and with each other as to form independent water-tight compartments, communicating with the decks and each other by water-tight doors worked from the deck. Double bottoms are a great element of both safety and strength.

5. Sufficient ventilation should be provided in passenger ships, to admit of closing all side scuttles and hatches in bad weather. Openings in the deck should be fitted with solid coverings hinged in place so as to be readily closed. Side and stern windows should have hinged dead lights to be always in place. Combings over engine and boiler rooms should be as high as possible, of iron, and riveted to the beams and carlings. Beams should be continued across without interruption, or made replaceable on going to sea. Cargo ports should be strongly secured by iron bars. All communications with the sea from engine room and pipes should be protected with conical or Kingston or sluice valves.

6. Pumps:—a brass-barreled hand pump to every compartment, or patent pumps having connections to this extent, except the forward and after compartments—the former to have a sluice cock. Also a donkey engine and pump capable of pumping from the bilge and from the sea, of feeding the boilers, and of throwing water on deck; also one or more bilge pumps worked by the large engines, with bilge injection pipes if the engines have condensers. In large vessels the donkey engines should have a separate boiler high above the water line, and communication with the main boilers beside; and all vessels should have a set of bilge pipes connecting every hold and the engine compartments with these pumps.

7. As a security against fire, there should be force pumps on the upper deck, and sufficient length of hose, with the necessary copper delivery jets, to reach either extremity of the vessel, and also suction hose or pipes from the sea. The cocks by which the working of the pumps is regulated, should be carefully arranged and marked, and great care should be taken that both cocks and pipes are accessible. A plan of the whole should accompany the ship's papers, and the crew should be periodically exercised in the use of the fire apparatus.

8. Ships are often badly stowed, sometimes with the weights too low, causing them to roll with such rapid and violent motions as to carry away the spars and otherwise endanger the ship, and at other times too high, making the ship crank and liable to turn over. The stowage, whether done by contract or not, should always be done under the direction of the captain, and he alone should be held responsible. It is known that under given conditions of structure and stowage, the number of oscillations per minute will be about the same, whatever the force of the impulse which causes the ship to roll. But no such observations have been made in merchant ships as to warrant any specific rules on the subject, and it is highly desirable that the attention of captains and owners should be directed to the collection of information.

9. The pipes and valves of water closets on deck below or near the water line should be strong and carefully fitted, or they may be the means of gradually and imperceptibly flooding the ships. In regard to boats, anchors and cables, no fresh regulations are required.

10. In order to provide for the rapid clearance of water which may break over the ship, flapboards should be fitted to the lower part of the bulwarks, sufficient in number and area to permit the rapid escape of the water.

Some members of the council (builders) dissented strongly from the report. Suggestions from other members not voted into the report, were recorded as worthy of consideration, such as: that there should be two hawse pipes on each bow, and a second pair of riding bitts; that on the beam of each compartment there should be painted the whole tunnage of the vessel and the capacity of the particular compartment; that the dead weight and measurement tunnage in each compartment should be shown on the ship's register before clearance, and that no dead weight should be allowed on the fore or after sections of any passenger ship; that all communications with the sea should be exposed to view, and readily accessible by the engineers; that certain portions of the ship, as the screw alley, might be made accessible for repairs after they had been bilged, by forcing air into them and expelling the water, and that with this view they should be made air-tight and in communication with force pumps; that spars and boats should be so disposed as to float off in the event of a wreck, and form a substantial raft; and that deck houses and other portions of the ship may be so fitted as to be readily detached as rafts.

Mr. Scott Russell stated that it was of the first importance in the construction of iron ships to have no parts exceptionally strong and rigid, or exceptionally weak. The extra rigid parts would eat through and destroy the ship, and the thin places would yield. Perfect continuity and uniformity of strength, as near as it could possibly be calculated at every point, was his theory of iron ship building, in a word.

CAPTAIN FORBES ON SAFETY APPLIANCES.—To the above report we append a summary of suggestions made in a recent lecture by Captain R. B. Forbes, the well-known ship owner, navigator, and nautical inventor:—

Some method of shutting off steam which can be operated from the deck in case of fire about the boilers; fixtures to close openings and smother out fires with steam from the boilers; apparatus to blow off steam and water from the boilers upon the fire, close them air tight, and thus make them serviceable either to float the vessel or delay its sinkage; the tops of saloons and cabins to be made detachable to serve as rafts; doors to be hung on pintles and provided with cork panels, or otherwise made life preserving; outward and inward-bound vessels to pursue different tracks, lessening chances of collision; vessels to carry mortars, for throwing lines; small boats to be supplied with canvas drags, the mouth held open with a hoop; also with kegs of oil, which are claimed to have been tried and found very serviceable in severe storms; stools, mattresses, and other fixtures to be made life preserving, etc. Attention is called to the fact that not a single life boat is furnished to United States naval vessels, and few life preservers.

Cements and Uniting Bodies.

In the preparation of cements and all substances intended to produce close adhesion, whether in a semi-fluid or pasty state, freedom from dirt and grease, without slovenliness, is a most essential and necessary condition.

A TEMPORARY CEMENT, to fix optical glasses, stones, jewellery, etc., on stocks or handles for the purpose of painting, repairing, or ornamentiug, is made by melting together at a good heat, two ounces of resin, one drachm of wax, and two ounces of whitening; with this applied to the article when heated, secure fixation may be obtained, unfixed at pleasure by the same means, viz., heat.

RICE CEMENT, which is made by mixing rice flour intimately with cold water, and then gently boiling it, forms a beautifully white preparation, and dries nearly transparent; it is capable of bearing a very high polish, and is very durable; it is in every respect far before the common paste made with wheat flour or starch; it may be formed, also, into a plastic clay.

FOR UNITING STONE, DERBYSHIRE SPAR, ETC., ETC., melt together four ounces of resin and half an ounce of wax, and about an ounce of finely-sifted plaster of Paris. The articles to be joined should be well cleaned, and then made hot enough to melt the cement, and the pieces then pressed together very closely, so as to leave as little as possible of the composition between the joints. This is a general rule with all cements, as the thinner the stratum of cement interposed the firmer it will hold.

CEMENT FOR CHEMICAL GLASSES.—Mix equal parts of wheat flour, finely-powdered Venice glass, pulverized chalk, and a small quantity of brick-dust, finely ground; these ingredients with a little scraped lint, are to be mixed and ground up with the white of eggs; it must then be spread upon pieces of fine linen cloth, and applied to the crack of the glasses, and allowed to get thoroughly dry before the glasses are put to the fire.

PUZZUOLANA CEMENT.—A kind of earth thrown out of volcanoes, of a rough, dusty, granular texture; its most important property consists in making a cement when mixed with one third of its weight of lime and water, which hardens very suddenly, and is more durable under water than any other. Manganese is found to be a valuable ingredient in water cements. Four parts of grey clay are to be mixed with six parts of the black oxide of manganese, and about ninety of good limestone, reduced to fine powder, the whole to be calcined to expel the carbonic acid; when well calcined and cooled, to be worked into the consistence of a stiff paste, with sixty parts of washed sand.

THE DIAMOND CEMENT for glass or china is nothing more than isinglass boiled in water to the consistency of cream, with a small portion of rectified spirit added. To be warmed when used.

LEAKY SKYLIGHTS may be stopped and cured with Dutch rushes, bedded in and covered with good white lead. On wet making its appearance it quickly attacks the rush, which swells up so tight and firm that all progress of wet and droppings is effectually stayed.

Lemery, the chemist, used the following lute for stopping retorts, etc.: Fine flour and fine lime, of each one ounce, potter's earth half an ounce; make a moist paste of these with white of egg, well beaten up with a little water, and this will be found to stop exceeding close.

Philosopher Boyle recommends, on experience, the following for the same purpose: Some good fine quicklime and scrapings of cheese, pounded in a mortar, with as much water as will bring the mixture to soft paste; then spread on a piece of linen rag, and apply it as occasion requires.

A most valuable glue for photographers, and extensively used by first-class bookbinders, is made from bottle india-rubber. This must be dissolved in highly rectified spirits of turpentine: the highly rectified spirit extracts every particle of grease, which is of the greatest consequence. As I have somewhere before remarked, it is not exactly what you do, but the way in which you do it; grease, above all things, is a most determined enemy to any of these preparations.—*Photographic News.*

THE SUEZ CANAL.

The prospects for a speedy completion of this great engineering work, from the latest accounts are not very flattering. The original plan contemplated the running of a canal 260 feet in surface width and twenty-six feet deep, connecting Port Said on the Mediterrancan with Suez, at the head of the Red Sea, a course of about ninety-six miles. From recent and trustworthy reports it appears that the maritime canal has been partially excavated as far as Ismaileh, a distance of forty-eight miles or just one half the total length. Below this city operations may be said to have fairly commenced, but great engineering difficulties must needs be overcome before the task will be successfully completed. The proposed route passes through high drift sands which when once excavated, it would seem, must continue an endless source of trouble and expense, the action of the winds and the corrosion of the banks by passing vessels, demanding constant attention and repairs.

For the first nine miles north of Ismaileh the canal is only dug to half its future complete width. Beyond this, for the remaining distance to Port Said, there are two channels, each of one-third the complete width, the center portion being left so that traffic may be carried on in the one channel while work is progressing in the other. The average depth throughout is only seven feet.

To furnish supplies to the workmen employed, a fresh-water course has been opened from the river Nile at Cairo, which runs in a serpentine course passing by Ismaileh, thence in a line nearly parallel to the main canal to the port of Suez. A lock near the former city joins the two canals and by means of it a vessel of eighty tuns burden not long since safely made a passage between the Mediterranean and Red Sea.

At the works at Port Said steam barges are at work inside the harbor, carrying earth from the excavations out to sea in a north easterly direction where it is in no danger of its drifting back. One of the buildings in the gardens which surround the Exposition buildings is devoted to an interesting collection of models of these steam barges and dredges, also models illustrating the whole series of works on both canals, and the region of country through which they are to pass, plans of the principal places along the line of the canal El-Guisr, Suez, Ismaileh, and Port Said. The interest in this collection is further enhanced by a great variety of stuffed birds, insects and reptiles found in the vicinity of the canal, and fossil specimens and curiosities unearthed during the excavations. The whole is presided over by a large sized stuffed camel.

Although interested parties have persistently published the most encouraging prospects actually, the main Suez canal, after seven years of labor and millions of money have been spent upon it, is now but about one-third completed, and at the present rate of progress full five years must pass before it, as a commercial highway, begins to repay the funds which its protracted construction has absorbed.

How Mosaics are Made.

A traveler writing from the Continent, says the Mosaics seem to absorb the most time and money in the least space, unless it be the solid gold decorations. We saw a table last week less than six feet in diameter, said to have cost two hundred thousand dollars, requiring the labor of a large number of men for fifteen years. Upon entering the hall where this kind of work is done, I could not doubt these enormous figures. Suppose, for instance, a thousand of the hardest and most expensive stones which will take on a high polish, to be cut into pieces three-eighths of an inch thick. These pieces are cut the other way into small pieces like shoe pegs, and where the shading from one color to another is sudden, these pegs must not be larger than a needle. Now the artist cuts and puts in these little pieces, selected according to their color, so as to give the coloring wanted as distinct as though painted. These pieces or pegs must be fitted so closely that lines of separation will not show, and set upon end side by side like types. They claim that ten thousand different shades of color are necessary; and in order to do this kind of work a man must be skilled in colors and shades as a painter, in order to place the colors properly, and then be the most careful and accurate of mechanics in order to fit the pieces, and then he must have patience enough to work on the cheapest and coarsest pictures one year, and upon a fine one, from ten to twenty years.

THE sixth enormous gun cast at the Fort Pitt Foundery for the Chilian Government, passed through this port a week or two since, accompanied by 100 balls of 1,000 lbs. each. The monster is twenty and a half feet long, twenty inches in the bore, and five and a half feet in diameter at the breech

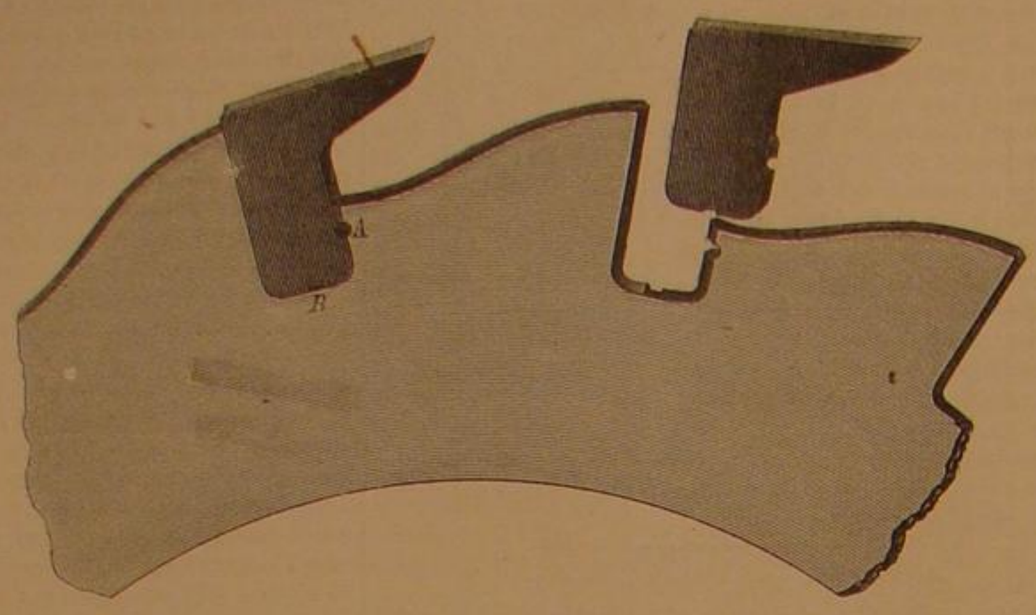
HOW TO GET THE BEST PAVEMENT.—It has been suggested that the Society for the Prevention of Cruelty to Animals could not do a better act of mercy than to offer a prize for the invention of a pavement best adapted for horses and not inferior to others in durabily and economy.

DR. CROSLEY, of Lowell, is putting up machinery for making coffin cases from surface slate instead of wood.

False Teeth for Saws.

The advantages of removable teeth for circular saws, especially over those cut from and forming part of the plate, are so apparent that they are not now generally denied by practical men. Inventors differ as to the best form of teeth and the best method of attaching them to the plate. We have lately published two plans, but the one herewith illustrated differs in some respects from those. It is the invention of N. W. Spaulding, one patent bearing the date Sept. 10, 1861, and a reissue April 21, 1863.

The form of teeth and method of inserting and holding is seen in the engraving of a section of a circular saw with two teeth, one in place, and the other detached. The bottom of the tooth has rounded corners in order that the strain on it may be distributed over a larger surface and prevent danger of fracturing the plate. Its edges have a recessed V-groove where they engage with the plate, while the edges of the recess in the plate are milled to fit the groove. A rivet at A, one-half the diameter in the tooth and the other half in the plate, holds the tooth securely in position. At the bottom is a slot, D, in which to insert a key to start the tooth when it is desired to remove it. False teeth with square corners tend to rupture the saw at their angles, and the rounding corners of this tooth are so formed for the purpose of remedying this difficulty. The result is that saws with this shaped tooth do not burst, but wear well under the severest treatment. The points are swedged to a chisel edge wider than the cross section of the body of the tooth.

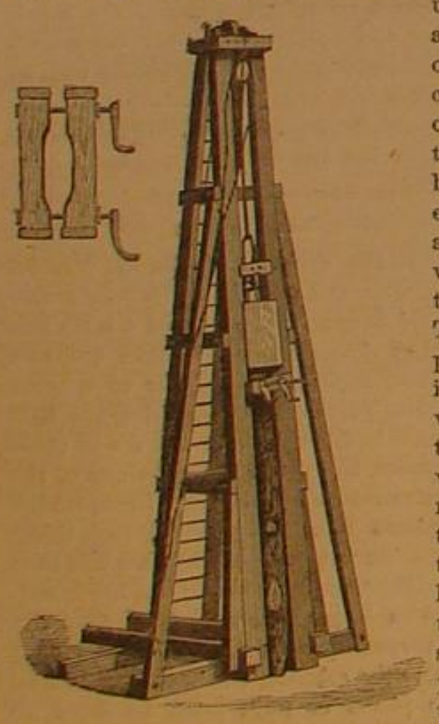


SPAULDING'S PATENT SAW TEETH.

For further particulars address N. W. Spaulding, 113 Pine street, San Francisco, Cal., or N. W. Spaulding & Brothers, 224 Washington street, Chicago, Ill., or Messrs. Branch, Crooks & Co., 116 and 118 Vine street, St. Louis, Mo. [See advertisement on another page of this paper.]

John M'Clay's Improved Pile Driving.

The engraving represents an improvement in the mode of driving piles. It will be readily understood by any one acquainted in the art. It consists of a yoke or clamp, constructed of either wood or iron, in such a way that it keeps the head of the pile immediately under the hammer until the driving is completed. When once adjusted the pile needs no further attention, whereas by the old method staples or bars were used requiring the close attention and hard work of four or more men; it is composed of two pieces of oak or other strong timber six inches square banded with iron at the ends. In these recesses are hewn or cut, somewhat octagonal in form, to fill the pile timber. Through the timber pass headed rods of one inch and an eighth iron, with threads cut on them and a nut and wrench combined; these rods are at such a distance apart as to nearly touch the uprights or leaders of the driver, thus controlling any sideway motion of the pile. It is estimated that three-fourths of the usual time and labor of the old process is saved bythe use of this device. Another advantage claimed is that it serves to hold the fibers or grain of the head of the pile together, thus preventing the splitting or shiving which so often occurs.



Patented June 12, 1866. Further information can be had of the inventor, John McClay, or Jeremy W. Bliss, No. 240 Main street, Hartford, Conn.

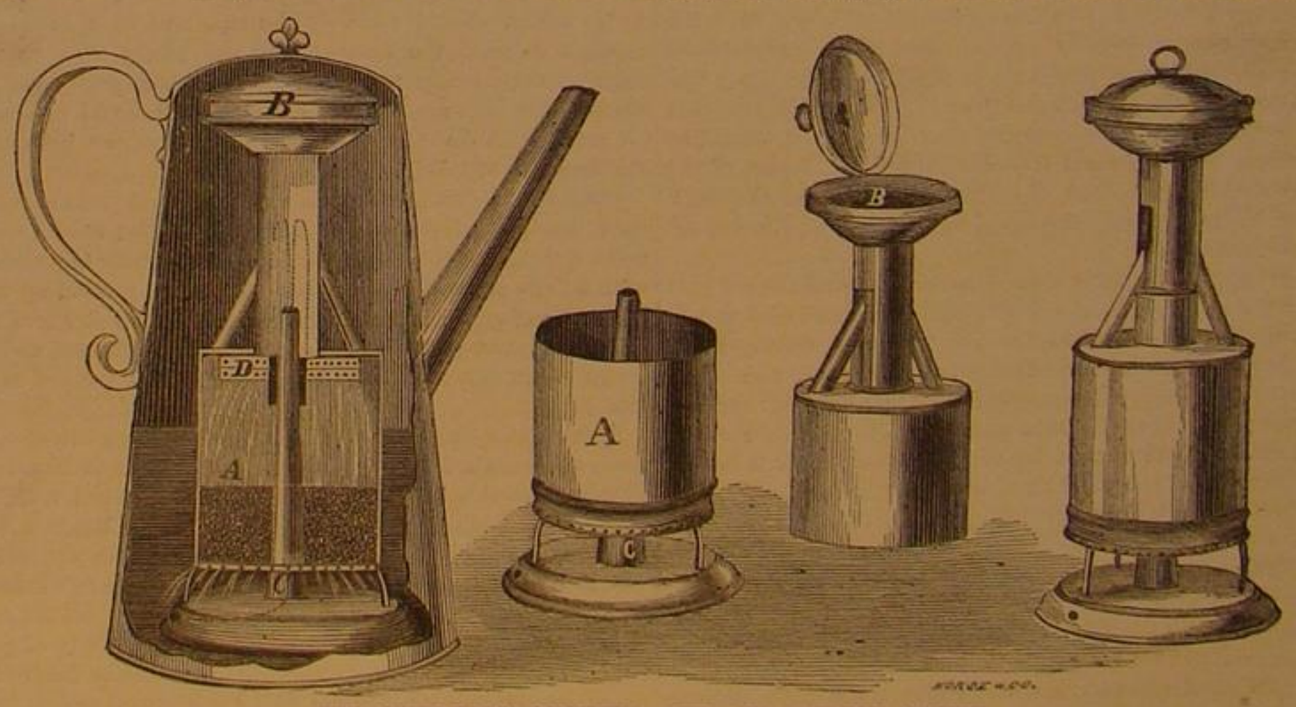
The Electrical Engraving Machine.

The inventor of this interesting apparatus, M. Gaiffe, who produced it in the London Exhibition in 1862, has since then developed it more perfectly, and now exhibits in the Paris Exposition a machine for simultaneously engraving any number of plates, of any scale orvariety of scales desired, from the same design, with an exactness of reproduction which has its equal only in electrotyping.

The machine, as described, looks like a face lathe, with any number of face plates parallel to the ways, and a slide rest carrying the graving tool at right angles to each of them. The rotation of all the face plates is exactly uniform, and the horizontal movement of the rests across the face of the plates from the center to the circumference, and extremely slow, is conveyed by one continuous screw, of the same pitch throughout, if engravings of the same size are desired, or if otherwise, the pitch is varied so as to cause the slide rest to move more slowly in proportion to the reduction of scale desired. The face plates slowly revolve, and the graving tools, starting at the centers of the face plates and progressing imperceptibly toward the circumferences, traverse the whole disk with a spiral line, closer or more open according to the pitch of screw and consequent rate of motion. The first face plate carries a copper plate on which the design is formed, preferably on an enlarged scale, in non-conductive varnish. The tool applied to this plate is simply a conductor with a platinum point, by which the currents transmitted through the exposed portions of the plate, or lights of the design, are passed on to all the other rests in the machine. Each of these carries a graving tool with a diamond point, pressed by a spring against the plate to be engraved, as it revolves upon the face plate. A pair of electro-magnets behind each graver retract it from the plate at each passage of electricity through the lights of the design, letting it fly back and strike the plate as the electricity is intercepted by the shades. The whole design is thus passed over spirally from the center and a *fac simile* of prescribed scale is engraved by each of the tools. Magnified by a strong lens the spiral dotted line which constitutes the engraving is traceable, and hence a bank note engraved by this machine could not be successfully imitated by any other means. Large maps, etc., have been reduced to minute proportions, and found as legible when magnified as the originals.

Improved Apparatus for Coffee, Tea, etc.

The engravings show views of the different parts of a contrivance for extracting the essential principles of coffee, tea cocoa, etc., without injury to the flavor or loss of the aroma.



WOODWARD'S COFFEE AND TEA EXTRACTOR.

A, represents the receptacle for the ground coffee, tea or cocoa. B is the cover, extension tube and top, which is placed, charged with the coffee, in the pot. The tube may be depressed or elevated to accommodate itself to the coffee pot or other vessel and is held down by the lid. Boiling water is poured through the tube into the receiver. In the center of the receiver is an upright tube, perforated at the top, which conducts the boiling water up through the receiver to fall back through the strainer, D, from whence it continually percolates through the coffee, to be again returned. Thus all the virtue of the coffee is extracted and none of the aroma is lost. The bottom of the receptacle is circumferentially perforated, forming a strainer through which the liquid passes while the grounds are retained.

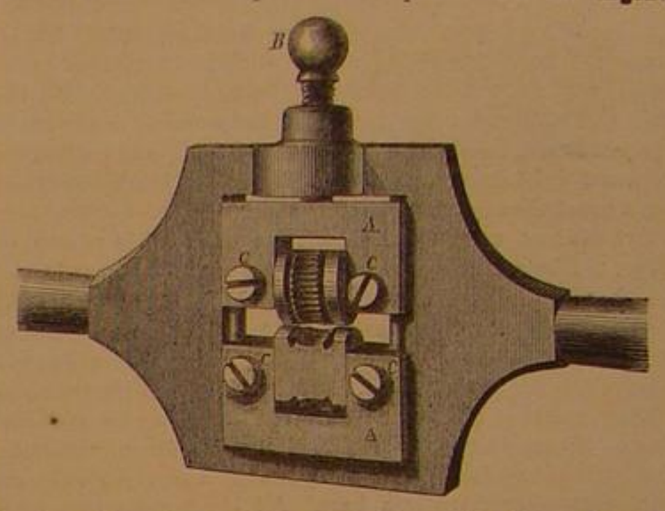
Its advantages are so apparent that further description is needless. It appears to be admirably adapted to its purpose. Samples can be obtained or further information received by application to J. Pickering, 17 Cortlandt street., New York city.

The Microscopic Fleet.

The current of blood, and its channels in the body, is the great canal by which the subtile life-supporter, oxygen, is carried along. It constitutes the means of communication between the interior of the body and the atmosphere, and serves for import as well as export. The blood corpuscles, which are continually rushing about in the stream, constitutes the exact analogue of a fleet of vessels laden with oxygen, and carrying the cargo to the most distant part of the system and all the different organs, where part of it is consumed for works going on there, while another part is stored up and accumulated for future use. The carbonic acid is the return load put on these little vessels, each of which are only visible under the microscope. In spite of their tiny form, they are able to transport forward and backwark four pounds and a half of oxygen and carbonic acid per day, to condence within themselves four hundred liters of oxygen from the atmosphere, and to give off as much carbonic acid, without any of their speedy and airy movements being discerned by the observer. During the day they export much more carbon than they import oxygen, and during the night, in quitude and sleep, they follow each other with rich cargoes of oxygen to provide for the expenditure of the next day.—*Dr. Brown.*

Gill's Screw-Cutting Dies.

When the ordinary dies in screw plates or bolt cutters become dull there is no remedy but to anneal, recut, and reharden them. The improvement represented in the engraving is to form dies so that when the portion in use becomes dull another unworn portion of the die can be presented to the bolt without removing and repairing the dies.



The device is to make circular dies, pivoted into sliding blocks, to be forced into position by a screw in the ordinary way, the dies being capable of being rotated at will. The engraving shows the face of a screw plate in which are the blocks, A, which are forced together by the screw, B. These blocks hold each a die of nearly cylindrical form which may be rotated by slacking the set screws, C, and held by screwing them up, the screws bearing upon their journals or pivots. One side of each die is planed or filed flat, so that when the flat side of each is in position a screw can be threaded up to the head. Where the bolt is long, and to be threaded only a portion of its length, the convex surface of the dies can be used. When one portion is dull the dies may be partially rotated to present a new cutting surface, These dies can be secured in a head for use in a bolt-cutting machine as well as in an ordinary screw plate. Henry Gill, of Mansfield, Ohio, is the inventor, a patent for the contrivtnce now being solicited through the Scientific American Patent Agency. For other particulars address as above.

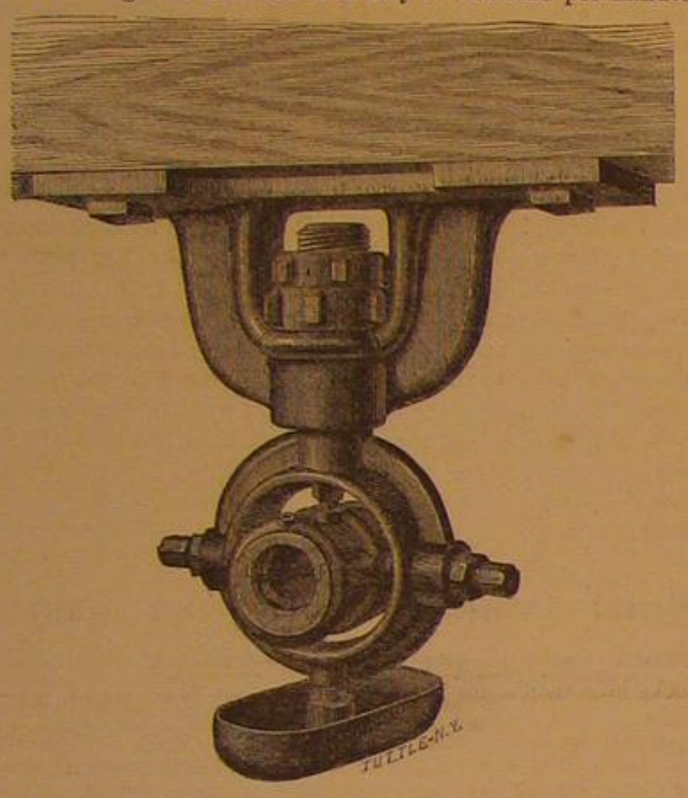
Ward's Clothes Pin.—This device, illustrated in No. 21 current Vol., page 358, is susceptible of a greater number of adaptations than therein mentioned. By turning one of the pieces half way around it gives two different sized notches to grasp the line and clothes, so as to be adapted to large or small lines or thick or thin clothes, while if the notches on both the pieces are brought together another sized line can be accommodated.

Mining.—The renowned Fremont estate, Mariposa, has for me time been lying perfectly idle. Not a mine on the grant is being worked, the shafts are filled with water, the machinery rusted, and everything apparently in rapid decay in consequence of the operations of the late Superintendent. The present overseer is engaged in straightening up affairs and will get the mills in operation at the earliest period.

DAVIDSON'S SELF ADJUSTABLE HANGER.

The work of hanging shafting with the old style of hangers is a laborious and vexatious task. It is difficult, after having got the boxes in perfect horizontal line, to level them so the shaft shall not strain nor spring. After the hangers are in place, one here must be raised and another there must be lowered by slacking and setting up bolts, "shimming" under the feet, or paring away the beams. But with such a hanger as that seen in the engraving all this annoying labor and consumption of time is avoided. After the line is drawn on the flooring timbers, a single hole is bored for each hanger, to receive a central projection on the face of the cross piece, and then the bolt holes are bored through. The hangers are then secured firmly by the bolts, no alteration of their positions being required if the center hole is bored correctly. For leveling, nothing more is necessary than to raise or lower the frame sustaining the box, by means of the nut and check-nut seated in the space between the two legs, which form the saddle. This can be done in a very few minutes and with very little exertion. It will be seen that the frame carrying the box is allowed to turn in a horizontal plane, while the method of swinging the box by the two screw pivots through the sides of the frame allows motion to that in a vertical plane, so that the shaft readily adjusts itself.

The box has a reservoir which holds sufficient oil, as guaranteed by the manufacturers, to run six months without re-oiling, and has been thus run eighteen months on a two-inch shaft making one hundred and fifty revolutions per minute.



Passages under the lining of the box connect a reservoir at each end, and in the center is a diagonal slot filled with felt or sponge which keeps the shaft always lubricated. A dripper is attached only to receive the oil which may run over in filling if more is poured in than enough to fill the box.

The manufacturers furnish a peculiar coupling to accompany this hanger, although it may be used with any coupling. This one, however, is a cylinder having a hole tapering from each end to the center—the ends of the sections of shafting being turned to fit and held by steel pins passing through coupling and shaft. A slot through the center of the coupling allows the introduction of a wedge to start the ends of the shaft, which do not fully meet, when a section is to be taken down to put on or take off a pulley, one of the pins in this case to be driven out.

This hanger and box was patented Sept. 7, 1858, and many hundreds of lines of shafting are running in it, giving in all cases perfect satisfaction. It saves all the oil, can be adjusted without stopping the engine, and is arranged for post bearings as well as for hangers.

It is furnished by Messrs. M. T. Davidson and Co., 84 John street, New York city, who will give any additional information desired. See advertisement on another page.

Pneumatic Railways in Switzerland.

M. C. Bergeron, Director of the Western Swiss Railways, has obtained a concession from the Canton de Vaud to connect the railway station and the Place St. François, at Lausanne, Switzerland, by means of a Pneumatic Railway.

The same engineer has lately presented to the British Association at Nottingham the plans for a Pneumatic Railroad over the Alps, by the Simplon Pass, commencing in the Saltine valley on the Swiss side, and the Diveria valley on the Italian side. The distance is 16 miles. M. Bergeron estimates the total expense at $4,000,000. The incline on the Italian side would be 1 in 14. On the Swiss side 1 in 6¼. He proposes a tube large enough to receive carriages of the size of an ordinary omnibus. The highest point to be reached is 6,000 feet above the level of the sea. The tube is to be cut in the form of a gallery in the side of the precipices, the debris being allowed to fall into the torrent below. The air current is to be produced by means of water wheels for which the streams furnish abundant power. This is by far the cheapest plan yet presented for effecting the passage of the Alps by railroad. Its economy is principally due to the small area of the proposed tunnel. The working expenses would be very light.

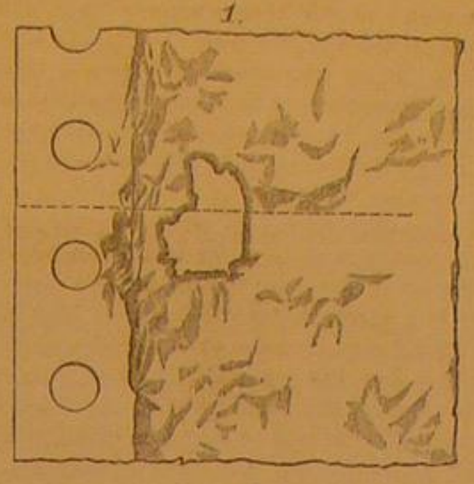
THE cost and expenses of the Erie Canal to Sept. 30, 1862, amounted to $52,591,101 81: tolls received, $59,264,810 62: clear direct profit to the state treasury, $6,773,864 81.

STEAM BOILERS---THEIR FORM, CONSTRUCTION, AND MATERIAL.

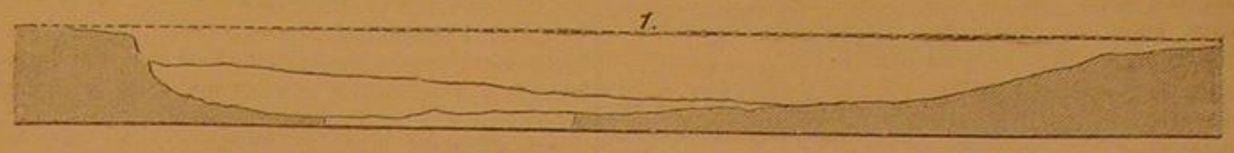
NUMBER SEVEN.

Probably no structure used in the mechanic arts is subject to greater and more rapid deterioration than the steam boiler. Beside the ordinary wear and tear to which everything beside is subject, it has insidious enemies which often give no present evidence of their depredations. Of these, corrosion

1.

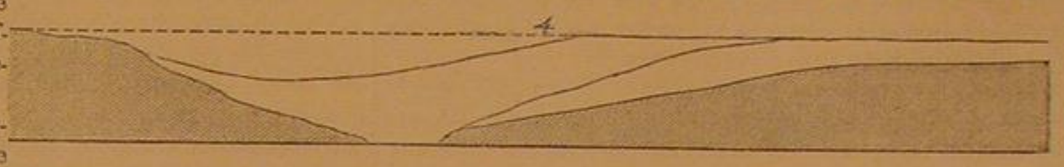


1.



is one of the worst. If internal, its progress can only be ascertained by occasional inspection, and its ravages generally defy all remedies. If external, it is hardly more readily discovered, especially if the boiler is lagged, cased, or otherwise covered. And in either case corrosion is an injury the effects of which cannot be remedied by repairs.

4.

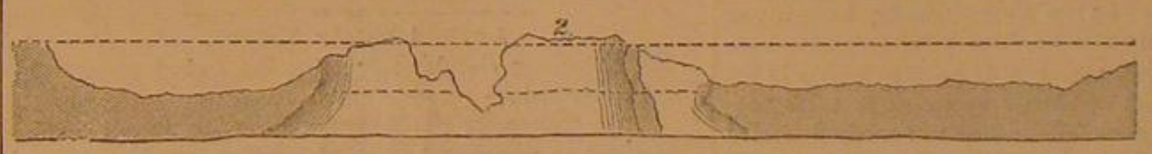


Nos. 1 and 2 with the corresponding sections show the effects of external corrosion. That in No. 1 was occasioned by covering the boiler with ashes, a common practice to prevent the loss of heat by radiation. The attraction of moisture by the ashes and the corrosive matter thus dissolved from its substance thinned the tops of the boilers in less than two

2.



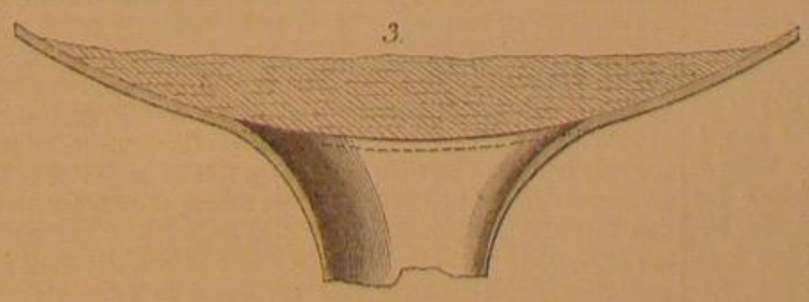
2.



years until, as seen in the section taken across the plan on the dotted line, a hole was made entirely through the plate. This work went on under the ashes undiscovered until the boiler was rendered unfit for service. Nos. 2 present a similar case only that the corrosion occured under a covering of sand after eight years working. It will be seen that the result is similar in each case.

Accumulations of scurf afford excellent opportunities for the development of corrosion inside the boiler. If not frequently removed the scurf forms a coating beneath which the work of destruction goes rapidly on. In a horizontal cylindrical boiler, the scurf is deposited to a dangerous thickness on the bottom, allowing the plate under it to become overheated and softened, when the scurf sinks down into a pocket which if unnoticed will soon become so weakened by corro-

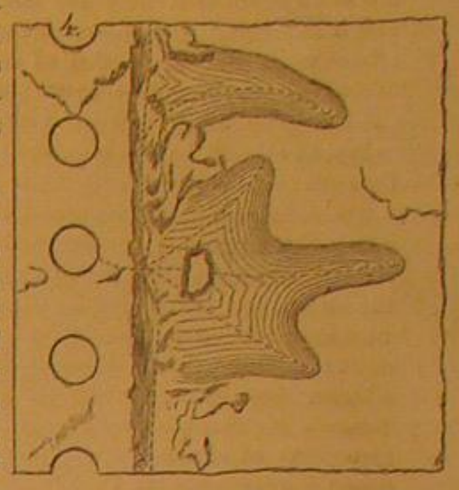
3.



sion as to burn quite through. One of these pockets is shown in No. 3. In this case the sediment had filled the bottom of the boiler to the depth of three inches at the lowest part, and by heating, the plate was bent down into a gradual curve, and thinned from half an inch to about one sixteenth of an inch

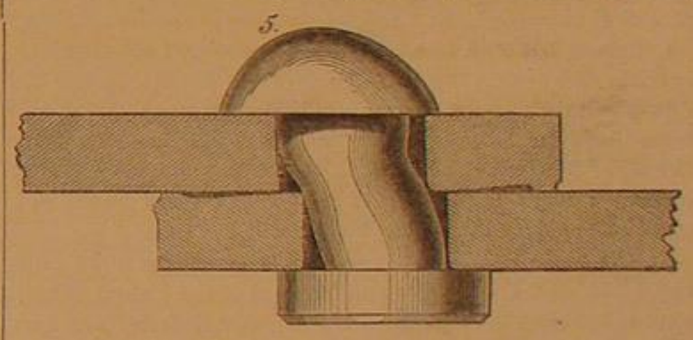
Leakage of rivets and seams is a prolific cause of local corrosion. When boilers are emptied on Saturday night, directly after working, and before the brick work has had time to cool, they expand by the heat remaining in the masonry, and the boiler becomes in some parts hotter than when it contains water, and rivets are sprung by the expansion. Sometimes this expansion is intentional for the purpose of loosening the scale. When the boiler is again filled and set to work the seams and rivets leak, causing the corrosion that is called "channeling." Nos. 4 show a specimen of this sort of corrosion. In this case the central rivet on the plan leaked and cut a series of channels into the plate along the course of the dotted lines, producing a hole through the plate. This corrosion had been going on for about four years. Many explosions occur from this cause.

4.



Faults in construction will ruin a boiler made of the very best material. No. 5 shows an instance of bungling workmanship in riveting and calking. An examination of this specimen is sufficient without explanation to enable any one to understand what it represents. Another instance of improper construction is given in the following from Mr. Thomas Hoge of Waynesburg, Pa. He says: "I send you a sketch of a portable boiler which I bought at sheriff's sale at an oil well last fall, and which though it did not "explode," the crown sheet, or plate over the fire, gave way and cracked enough in places to let the water blow through and put out the fire, and was damaged beyond repair except by taking

5.



out the whole sheet and putting in a new one and staying it as the first should have been secured.

The sketch shows a cross section of the boiler through the fire box. The crown sheet was flat and about 28 by 48 inches and stayed with crown bars of angle iron as shown, with washers between the bars and sheet, about ¼ of an inch thick. The bars were not as long as the width of the fire box by four to five inches (more than two inches at each end) and the last rivets still further from the edge by 1 to 1½ inches, making 3 to 4 inches from the rivet to the flanged corner of the plate. The crown bars should have reached clear over the crown sheet and have been bent down so as to rest upon the edge of the side sheet where it would have had a permanent support for the immense weight to be sustained; but instead of this they had no support at all beyond the last washers, though they projected a little over them, consequently all that part of the sheet riveted to the bars was very rigid and on being raised or depressed all the strain would come at the last rivet in each bar, and the sheet having no support from there to the riveted edge at the side sheet, would be easily bent down or "kinked" at the right hand as shown in the sketch. I had plenty of water and 90 pounds of steam when the plate at one side bent down and was fractured as shown; and most probably would have been torn clear out but the ends of the crown bars beyond the washers came down until they rested upon the sheet at the extreme end, thus supporting the weight about an inch nearer the edge of the sheet, where it had support by the line of rivets and where it was capable of sustaining a much greater weight than further in at the washer. A little figuring will show that there was over 120,000 pounds of pressure on this sheet when it gave way, or over 8,000 pounds on each outside washer at about 3 inches from the

flanged corner. Is it any wonder that a quarter inch sheet was bent under such a load? I got a good blacksmith to assist me and we took the old sheet out in less than a day; then I took it to a boiler yard 50 miles off and got a new sheet and crown bars made and we put it in ourselves without any assistance from machinist or boiler maker, and at an expense of not over $200, while if I had taken it to a machine shop, as all said I must do, and pay $5 to $6 per day it would have cost me $500 to $600 before I got it back to its place again. Not that I depreciate the services of good machinists or the advantage of machinery, but if a man has the ability to do his own repairing I like to see him exercise it, but if he has not the ability, or cannot see his way clear he had better not commence it. I have had 122 pounds of steam on my boiler since we repaired it, without any sign of weakness. Finally I would advise every man who intends to purchase a boiler especially an "oil engine" made by an unknown party, to examine it thoroughly and not conclude from external appearance, as I did, that it is all right within, where it is not easy to see; and if manufacturers continue to make such defective engines as the above, just let them keep them. They know, or ought to be made to know by a law or loss of business, that such gross malformations will not be tolerated."

Correspondence.

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

Why the Commissioner does not Increase his Force.

MESSRS EDITORS:—I find in the last number of your wide-spread and useful journal an article censuring the Commissioner of Patents, written without proper investigation, and inspired no doubt by your zeal for the rights and benefits of inventors who look to you for information on subjects connected with their interests as such.

Let me refer you to the Commissioner's report, published in your 12th number, under date of 23d of March last. He says there, in brief, that the clerical and examining force cannot be augmented without providing more room, as every room is at present filled far beyond its utmost capacity, and the serious obstacles to business cannot be remedied in any other way than by furnishing additional rooms.

In every part of the report we have it stated over and again the *want of room*, and it is that, and that alone, which is the barrier that opposes the "progressiveness of the department."

Congress, it is true, has given the examining force required; and it is also true it has turned a deaf ear to that part of the Commissioner's report where he calls upon it "in the confident hope that your honorable body will take measures to afford the relief so much needed," *i. e.*, "the indispensable necessity for much more room in order to properly carry on the now great and rapidly increasing business of the Office."

In the same number that gives his report we find an editorial headed "The Rights and Wrongs of the Patent Office," after eulogizing the Commisssoner's "pathetic facts," and "unadorned statement," you wish he "had taken the opportunity to urge the just complaint of the inventors more at large," etc.

In the face of this just and strong statement in your editorial, and a daily knowledge of the Office's condition, it is fairly presumed, you turn round and throw the entire *onus* of the "inactive measures" on the Commissioner, knowing as you must, as a matter of necessity, from your extensive business with the Office, that Congress is *solely* to blame in not providing room for the patent business which sustains "the magnificent building," and for which it was solely designed.

The Indian Bureau, and Agricultural, and Land Office, and Pension Office, have no right to hold rooms in it to the exclusion of the Patent Office, which seems to be regarded as on sufferance, the same as the cuckoo regards the robin even in its own nest.

The Commissioner is doing the best he can to crush together or conglomerate the examiners to make room for more, and as soon as he has got a perch or two ready in some small out-of-the-way cage of a room graciously granted him in any corner, he will bring the birds into the cage, and there, under difficulties, do what he can for inventors, and patiently await the tardy action of Congress. A SUBSCRIBER.

Washington, D. C.

Caterpillars---Care of Trees---Objections to Metal Lamps.

MESSRS. EDITORS:—In No. 22, current volume, on page 346 I notice a letter from a correspondent headed "Kerosene and Caterpillars." I protest against the gentleman's suggestions; the practice of boring holes into the hearts of trees is as deadly to them as a bullet hole through the heart of an animal. The introduction of milk by injection into the veins of man is said to cause death; what then is likely to follow the mixture with the sap of a tree of mineral oil, tainted with impurities and corrosive chemical matter. Kerosene has been found to contain sulphuric and hydro-fluoric acids, etc. Are these substances proper dilutants for the sap of trees even in minute quantities? Introduce a chip of wood into either of the above acids, note the effect, and consider.

As to sulphur, I do not believe that a tree has ever been damaged by it; in fact, I do not believe that a single grain of the mass corked up in the tree was ever taken up in solution by the sap and circulated. A fine row of ancient elms before a public edifice in this city began to die—real cause, defective and improper trimming, supposed cause, "caterpillars," etc. Holes were bored into the hearts of the trees and roll sulphur introduced. In a short while the trees were all dead. When they were cut down the sulphur was found unchanged. Those trees died of improper trimming and the boring of the aforesaid holes, and here allow me to say a few words on the training of trees. Elm trees require peculiar care. A branch growing in the wrong place should never be suffered to become a large branch. It should be immediately cut off. The amputation of a large limb is almost certain to be the death of the tree; even when the stump is protected it soon begins to decay, and though to a superficial observer it might seem perfectly sound, a single thrust directed by a skilled hand would penetrate the deceitful crust and lay open the mass of decay within. From that stem the poison of decay slowly crawls. Its progress cannot be discerned by the outward appearance of the tree, but it reaches the heart of the tree and destroys it: soon the leaves begin to wither and the tree dies.

There is another subject to which I desire to call your attention. I recently observed an article in your paper recommending the adoption of brass or metal resevoirs instead of glass for the oil in kerosene lamps, as less liable to burst. Now, brass is a much better conductor of heat than glass. Did you ever attempt to raise or lower the wick of a lamp which has been burning some time? If so, you must have remarked the heat of the brass handle; that heat is not confined to the handle. It will be found on examination that all the metallic portions of the lamp are equally hot. Suppose the oil contained within such a medium. How long would it be before the amount of gas evolved would be sufficient to burst the strongest metal lamp? A metallic lamp, burning kerosene, resembles a powder magazine with burning fuse attached. F. R.

Albany, N. Y.

What Twenty-five Cents Will Purchase.

In these days of high prices our readers will no doubt be surprised to hear of an article that is not only really cheap, but actually valuable. We allude to the new edition, just published, of our book "For Inventors and Mechanics." For 25 cents the purchaser obtains a neat little bound volume of 108 pages, elegantly printed, containing among many other things the following:—

The complete Census of the United States by counties, including a table of the population of the principal cities and towns; The complete Patent Laws of the United States; Forms for Assignments and Licenses; Official rules for proceedings at the Patent Office; 140 diagrams of Mechanical movements, with descriptions; The modern condensing steam engine, with engraving and nomenclature of the various parts; Diagrams of the rotary steam engine; Substitutes for the crank; Outlines of practical geometry; How to calculate the horse-power of engines, water, and water wheels; How to sell patents; How to obtain patents, home and foreign; Table of steam pressure; Table of heat conductors; Information upon assignments, reissues, extensions, interferences, infringements, etc., together with a large amount of other valuable illustrated matter,

Published by Munn & Co., 37 Park Row. Price only 25 cents. Sent everywhere by mail on receipt of the price. Also to be had of the leading news agents.

An intelligent and appreciative correspondent, in a recent letter, thus speaks of the above publication:—

"I think there was never before printed or published so great an amount of knowledge in so small a book."

We think so too, and we advise everybody to supply themselves with a copy while they are to be had.

Locked Safety Valves.

The following circular respecting the locked safety valve has been issued:—

TREASURY DEPARTMENT, Saturday, June 1, 1867.

In order to remove all cause of complaint and secure uniformity among the several Inspection Districts in respect to locked safety valves, the commission convened by order of the Department to examine and report upon the life saving inventions, have examined such safety valves as were brought to their notice, and have approved the five hereinafter specified as meeting in the highest degree yet attained the requirements of the law. The results attained by the commission in this direction have been submitted to the Board of Supervising Inspectors convened in special session in Washington, and by it unanimously approved by a majority of the members of the board being present. At their request the Department now announces that henceforth any one of the valves herein specified may be used in any inspection district at the option of the steamboat owners, subject, of course, to the usual inspection and tests applied by the local inspectors, and to examination and approval, or disapproval, for special reasons, by the supervising inspectors. It is to be distinctly understood that these valves, though in their general character approved, are yet to be subjected to the most careful and exact scrutiny as to the quality of material and workmanship; and their sufficiency in each particular case to meet the demands of the law. It is also to be understood that this enumeration is by no means designed to exclude other valves, equally meritorious, that may be presented, but that supervising inspectors are required to afford to all such a thorough and impartial examination, and accept any that are found to possess merit equal to those now selected. The valves which have been chosen are: First, the American high and low pressure: second, the Robinson high and low pressure; third, the Farrar high and low pressure; fourth, the Mason high and low pressure; fifth, the McMurchy.

HUGH MCCULLOCH, Secretary of the Treasury.

New Steamers.

The Pacific Mail Steamship Company has just completed, in this city, another large and magnificent ocean steamer named *Celestial Empire*. She has one American beam engine of 105 inches diameter and 12-feet stroke; wheels 40 feet diameter and 12 feet face, with a bucket width of 24 inches. She has surface condenser arranged as part of the engine, fitted with brass tubes ⅝ inch diameter and 9 feet long, with the joints made with "Allen's compressed wood-packing," and the condensing water thrown through the tubes by means of an Andrew's rotary pump, driven by a pair of inverted direct acting engines, geared two and a half to one. Connecting with the suction of this pump are valves communicating with the bilge of the ship, so that in case of leakage, the whole capacity of the pump can, in a few moments, be used to free the ship, amounting to over 20,000 gallons per minute. Steam is supplied to the engine by four horizontal tubular boilers, placed forward of the engine in the hold of the ship, arranged with the fire-room fore and aft, and the uptakes connecting to one smoke-pipe of 10 feet diameter. The tubes are 3 inches diameter by 7 feet long. Steam chimney 20 feet high, which gives great freedom from priming even in the heaviest of weather. The boilers contain 24 furnaces, with a total of 585 square feet grate surface, and 16,700 square feet of fire surface, which gives, with great ease, a working pressure of 20 pounds for the engine. In connection with the main engine and boilers, the engineer department is furnished with two donkey steam pumps of large capacity, and arranged to pump from the bilge, or to feed the boiler, or throw water on the different decks in case of fire. They are supplied with steam from an independent boiler, so as to be worked when steam is not on the main boilers. There is also supplied a hoisting engine, for delivering and receiving cargo, and coaling the ship by steam, in fact, everything that would add to the efficiency of the engineer department has been supplied.

The *Celestial Empire* is the second largest vessel ever laid down in the United States. The first one of the same class was the *Great Republic*, being a sister ship, belonging also to the Pacific Mail Company. The latter, it will be remembered sailed a few weeks since from this port to take her place on the newly established line of the Company, to ply between San Francisco and China *via* Japan. In many respects these two vessels are nearly alike. They are the largest vessels in the world, next to the *Great Eastern*, devoted to the passenger trade, and reflect the highest credit upon our naval architects, shipbuilders and machinists. Those of the Cunard line, and even those of the celebrated French line, look like fourth rate steamships alongside of this modern ark of the Pacific Mail Company.

Recent American and Foreign Patents.

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

APPARATUS FOR MAKING VINEGAR.—Wendelin Weis, St. Paul, Minn.—This invention consists in so constructing an apparatus for making vinegar that the vinegar can be made in a very short time and with the aid of but one set of shelves, and that the shelves can be easily and quickly cleaned.

PESSARY.—E. T. Hofmann, Poughkeepsie, N. Y.—This invention relates to a pessary which contracts downward all round and fits the entire neck of the uterus, anterior, posterior, and lateral, as far up as said uterus extends into the vagina, the posterior surface of the pessary being made to fit the convexity of the sacral vertebræ and its anterior surface to the neck of the bladder, so as to give to these parts protection from pressure. A depression on the upper surface makes room for the cul de sac, and flat inclined surfaces on the sides keep the pessary in position and prevent any undue lateral motion of the same.

STEAM BOILER.—William Lowe, Bridgeport, Conn.—The object of this invention is to improve what is known as the horizontal tubular or flue boiler, and it consists principally in forming a combustion chamber within the shell of the boiler, directly over the fire.

NUT MACHINE.—James Haslam, Philadelphia, Pa.—This invention consists in arranging a catch upon the end of the vertical slide bar, which by the old process, holds the nut while it is being squared, whereby the nut is caught and held in position.

BOLT AND RIVET TRIMMER.—M. D. Budd, Roscoe, Ill.—This invention consists in constructing a tool for cutting or trimming bolts and rivets in blacksmith work and other iron or metallic work.

EQUILIBRIUM STEAM VALVE.—R. F. Brown, Savannah, Ga.—This invention consists in forming the valve with apertures for the admission and exhaust of the steam, in such a manner that the steam presses equally or nearly so upon each side of the valve.

GRATE.—William Keiser, Stroudsburg, Pa.—This invention consists in making the grate in two parts, and operating each part from the outside of the stove.

STEAM AND WATER-HEATING APPARATUS.—Alanson Cary, New York City.—The object of this invention is to provide a safe, efficient, and economical apparatus for the warming of private houses and public buildings of every description by heated air, and the invention consists in placing in a suitable apartment a succession of hollow plates, so constructed as to be steam and water tight, which plates are connected together and also connected with a steam boiler by suitable pipes. Also in an arrangement of tubes through the said plates, whereby it greatly increases the heat-radiating surfaces.

EVAPORATOR.—Henry Lighty, Attica, Ind.—This invention has for its object to furnish an improved evaporator, so constructed and arranged as to greatly diminish the labor attending the evaporation of the juice, and at the same time to separate both the scum and sediment from the sirup, and to guard against scorching and burning.

GATE.—B. Homer Fairchild and Emery Sadler, Farmington, Mich.—This invention consists in forming the gate with the forward end or ends of the upper or upper and lower horizontal bars extending out in front of the forward vertical bar, so that the gate may be partially opened and secured in place to allow the passage of small stock while larger animals are prevented from pasing.

AXLES FOR WAGONS, CARTS, ETC.—F. McManus, Ellenburg Centre, N. Y.—This invention consists in winding a wooden axle with wire, to prevent it from wear.

POTATO DIGGER.—J. C. Richardson, Benton, Me.—This invention has for its object to furnish an improved machine by means of which potatoes may be dug rapidly and thoroughly.

CAR COUPLING.—John B. Behrens, Pearl, Ill.—This invention has for its object to furnish an improved car coupling, so constructed and arranged that in case of accident to any car or cars of the train, the injured cars shall uncouple themselves from the others, so as not to drag all the cars with them to destruction.

PRESS OR COVER FOR TUBS, BARRELS, ETC.—Hiram L. Chase, Bath, Me.—This invention has for its object to furnish a simple, convenient, and effective means for keeping salted meat, pickled fish, or any other articles under the pickle or brine to preserve them.

MACHINE FOR DESTROYING POTATO BUGS.—Henry Pitchforth and Wm Benson, Muscatine, Iowa.—This invention has for its object to furnish an improved machine, by means of which the bugs may be conveniently whipped from potato vines, and destroyed.

WROUGHT IRON PLOW BEAMS.—Waldon Eddy, Greenwich, N. Y.—This invention has for its object to improve the construction of wrought-iron plow beams, so as to make them easier of manufacture and more efficient in operation.

POST AUGER.—Thomas Leeson, Sharon, Wis.—This invention has for its object to furnish an improved auger for boring post holes, simple in construction and effective in operation.

HAT-SIZING MACHINE.—S. S. Middlebrook, Sandy Hook, Conn.—This invention relates to a new and improved machine for sizing hats, reducing their dimensions by rubbing and friction, after being formed in the usual way. The invention consists of two endless aprons placed vertically in a suitable framing, and one arranged to travel or move a trifle faster than the other, and both so arranged as to have a reciprocating motion, whereby the desired work may be effectively and perfectly performed.

SIFTER.—R. C. Ludlow, St, Louis, Mo.—This invention relates to an improvement in the construction of round sifters, sieves, or riddles for sifting flour, meal, and other substances.

PROCESS OF RESTORING SULPHURIC ACID, ETC.—Oliver W. Farrar, Pittsburg, Pa.—The nature of this invention or discovery consists in an improvement in the process of restoring or recovering the sulphuric acid which has been used for refining petroleum, coal oil, naphtha, or other similar hydrocarbon oil or substance.

TURBINE WHEEL.—Albert A. Wood, Manlius, N. Y.—This invention relates to a new gate, which is intended particularly for that class of turbine wheels which is known as Jonval's turbine wheels, but may be applied with advantage to water wheels of various different construction. It consists of a ring or segment provided with one or more lips which correspond in number and position to the guide curves, and which are themselves curved in such a manner that the space or spaces through which the water passes to the buckets of the wheel can be enlarged or diminished, and the water can be always made to run on the buckets in a solid stream. The ring which carries the curved lips is operated by an endless screw and suitable gear wheels.

COFFEE BOILERS.—Edward F. Woodward, Brooklyn, N. Y.—The design of this invention is to furnish housekeepers with an apparatus for boiling tea, coffee, cocoa, or other vegetable substances, and extracting therefrom their virtue and flavors and retaining the same in all their original strength and delicacy.

FENCE.—Thomas Morris, McGregor, Iowa.—This invention has for its object to furnish an improved fence, simple in construction and easily put up and taken down.

COMPOSITION.—Cassius Carroll Peck and Francis Ernest Engelhardt, New York City.—This invention consists in adding to a strong solution of common glue or gelatine, or chloride of lime, or in its place acids, such as sulphuric or sulphurous acid, or any other mineral acid, and bichromate of potassium or any other alkaline bichromate, to which composition a strong solution of penta sulphite of calcium or other sulphite is added.

MOP WRINGER.—O. C. Barnes, Stowe, Vt.—This invention relates to an improvement in the construction of a mop wringer or press, and consists in a rectangular box nearly or quite square to serve as a vessel for holding water instead of a pail, which box is provided with a lever treadle that moves a follower placed on a perforated platform in the upper part of the box in such a manner that it shall press upon and squeeze the water out of the mop.

RAILROAD CHAIR.—J. W. Shively, New York City.—This invention relates to an improved manner of uniting, joining and supporting the ends of railroad rails, and consists in such a construction of the rails and double cheek bar that the friction of the trains passing over the rails is transferred from the edge of the rail to a projection on the chair or cheek bar, whereby the ends of the rails are protected from the hammering and consequent destruction by the trains.

FIRE KINDLER.—Verlin G. Tansey, Quincy, Ill.—This invention consists in providing means whereby the troublesome operation of kindling a fire from either wood or coal may be performed by petroleum or other oil, with the greatest ease and at a very slight expense.

LIQUID METER.—Parcel Brinkerhoff, Chillicothe, Missouri.—This invention consists in constructing an instrument by which I am enabled to measure out and discharge given quantities of liquid by merely turning a lever when the meter is attached to a barrel or a vessel containing liquid, thus obviating the necessity of resorting to measuring cups of different sizes for that purpose.

IMPROVED SUBSOIL PLOW.—Rufus Peet, Castile, N. Y.—This invention has for its object to furnish an improved subsoil plow so constructed as to be easily repaired in any or all of its working parts, which shall be easily worked, and which will do its work effectually, loosening up the soil to any desired depth.

SELF-ACTING WEATHER STRIP.—C. E. Butler, Hudson, N Y.—This invention relates to a weather strip and to the manner of applying the same, and consists in so constructing the fastening and other devices that the weather strip is at all times firmly pressed against the door or window to which it is applied.

PARALLEL VISE.—Isaac C. Tate, New London, Conn.—The object of this invention is to adjust vises or clamps of any suitable construction to the use of carvers and others who have to work on different sides of the article held in the vise, and consists in mounting the vise upon a universal joint so that it can be turned and inclined to any desired degree thereby enabling the turning of the article in the vise to the light or to the front of the operator or to any other desired position.

FIRE ESCAPE.—Robert Mackinzie and James Cooper, New York City.—This invention relates to a fire escape which consists of a car suspended from a rope, the latter passing over a pulley block which is secured to the window frame on which this escape is to be used. The pulley block is attached to a cross head which is fitted into hooks that are screwed or otherwise fastened to the said window frame, and the car is guided by ropes, of which the upper ends are secured to the same cross head, while their lower ends are securely anchored in the ground.

WHEEL FOR VEHICLES.—Elias Hoxy, Montezuma, N. Y.—This invention relates to such an arrangement of the hub of a wheel that a larger number of spokes can be easily arranged in one wheel whereby lighter material may be employed for the spokes as well as for the fellies and whereby the spokes are more securely attached to the hub than was heretofore done. The invention consists in the use of a metal ring arranged around the wooden hub and provided with a zig-zag flange projecting from the center of the ring being arranged around the outside.

CIRCULAR SAW.—J. W. Clark, Iola, Kansas.—The design of this invention is to provide a self-adjusting guard for circular saws for preventing all possibility of accidents while in no way interfering with the operation of the saw or the handling of the lumber in passing it to or taking it from the saw, and at the same time abating the flying saw dust by conducting it under the saw table.

CHEESE PRESS, ETC.—Wm. H. Ragan, Fillmore, Ind.—This invention relates to a new and improved plan of construction of a press adapted to pressing cheese, grapes, apples, and other substances.

APPARATUS FOR DESTROYING MOTHS.—Charles F. Worch, New York City.—This invention consists in the use of a spacious box made of wood or any other suitable material which is made air tight and provided with a furnace and smoke pipes, etc., so that the inside of the box may be heated to about 120° Fah. Furniture, clothing and any other material containing moths can be placed in the box and is then subjected to the heat for from 3 to 10 hours. The heat is not very intense but as the box is air tight the moisture will be extracted from everything in the box, moths as well as horse hair or wool. The moths are soon killed by the extreme dryness, and the eggs are from the same cause soon completely withered.

PUMP.—Thomas Patterson, New York City.—This invention relates to a pump in which a continuous stream of water is made to pass through the suction and discharge pipes. It consists principally in the use of a radial arm or piston that oscillates around the axis of a circular cylindrical vessel. A stationary abutment is arranged in the latter, extending from the axis to the circumference; and on each side of the same are openings of channels which connect the cylinder with the discharge and suction pipes.

MACHINE FOR MARKING CORN GROUND.—George Sprague, Spring Hill, Kansas.—This invention relates to an improved plan of constructing a machine for marking the rows in a field for planting corn.

FASTENING WAGON SEATS.—Elias Hoxy, Montezuma, N. Y.—This invention relates to a new manner of securing wagon seats to the frame or box of the wagon so that neither the sill of the seat nor that of the frame is weakened by boring holes into them for the purpose of securing the necessary bolts or screws. Moreover, the seat is very securely held down and can be very easily removed, if desired.

BONE CHARCOAL KILN.—Adam Weber, New York City.—This invention relates to improvements in the construction of kilns for reburning and purifying "bone black" or bone charcoal which has been used in the refining of sugar and became charged with vegetable matter so as to destroy its filtering property.

VENTILATING DOOR.—Theodore R. Timby, Saratoga Springs, N. Y.—The object of this invention is to keep the rooms of a building, those rooms which communicate with the hall, in a perfectly ventilated state by means of openings or holes made through the upper and lower parts of the door and covered by deflectors.

MAGIC ARROW.—H. C. Griffin, Franklin, N. H.—This invention relates to a simple toy for children designed to supersede the ordinary bow and arrow, and it consists of an elastic cord constructed of india-rubber or other suitable elastic material, and having its ends connected to the prongs of a forked bar and an arrow provided with a slit near its head to receive the elastic cord, which, by drawing back the arrow is stretched or distended so as to propel the arrow a considerable distance when the same is released.

JACK FOR RAISING AND LEVELING RAILTOAD TRACKS.—Seman Taber, St Joseph, Mo.—This invention relates to a new and improved jack for raising and leveling railroad tracks. The object of the invention is to obtain a simple and portable device for the purpose specified, one which may be manipulated and applied with the greatest facility, and constructed at a moderate cost.

METAL WHEELS FOR RAILROAD CARS, ETC.—Samuel Vanstone, Providence, R. I.—This invention relates to an improved metallic wheel, and it consists in forging or striking up the same, or casting them of Bessemer steel or of iron malleableized and then forging them into the desired shape.

BREAD-CUTTING MACHINE.—S. D. Simmons, Brooklyn, E. D., N. Y.—This invention relates to a new and improved device for cutting bread and is an improvement on a machine for the same purpose for which Letters Patent were granted bearing date July 25, 1865. The object of the present invention is to simplify the construction of the machine, reduce the cost of manufacture, and render it capable of being operated with far greater facility.

BEEHIVE.—Volney Leonard, Springfield, Pa.—This invention relates to a new and improved beehive, and has for its object the protection of the bees from the moth, perfect ventilation, uniformity of temperature, and a novel construction of the spare honey boxes and honey board, whereby several advantages are obtained over hives of ordinary construction.

LOCK.—Henry Jackson, Brooklyn, N. Y.—This invention relates to a new and improved lock of that class in which the tumbler or tumblers are attached to a sliding bolt, and has for its object the prevention of the picking of the lock by obtaining a pressure of the tumblers against the stump and thereby ascertaining the precise position of the slots in the tumblers, a practice now very successfully adopted by burglars in picking tumbler locks. The invention has further for its object the obtaining of a firmer or stronger bolt than hitherto, an important feature when the invention is applied to padlocks.

SHEEP SHEARS.—John Ralston, Slippery Rock, Pa.—This invention relates to sheep shears in which a movable cutter is pivoted to the face of the stationary cutter, the latter being divided into two or more fingers or bars presenting so many cutting edges. The movable cutter is operated by the spring and is drawn obliquely across the cutting edges of the stationary fingers, thereby producing a drawing cut requiring less power and producing a cleaner cut than could be done with the sheep shears now in use.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisemets at 50 cents a line, under the head of "Business and Personal."

W. J. T. and J. H., of Fla.—The *Dictator* was built, and launched from the foot of 13th street North River, New York. The first named correspondent is in error. We shall publish an engraving of the vessel in a week or two.

G. K., of Pa.—We have always preferred to have the pressure of the steam in a gate on the top of the valve rather than on the bottom, although the ordinary gate will work either way. When the steam is introduced on the top it helps to keep the valve steam tight on its seat.

G. M., of Mass.—It would seem that a sledge with the handle near its top or head end would be an unhandy implement. The handle should be placed somewhere near the center of gravity in order to balance. This is the principle upon which ax heads are hung, and as the sledge has a round handle it would seem to be still more desirable in this case.

D. S. M., of Ill., endorses the statement on page 330 that green wood does not expand on freezing. He is led to his conclusions by observations which have been made in his business, which appears to be that of a cooper.

R. T. W., of Ohio.—When you see a rainbow the sun is always at your back. The sun, the eye of the observer and the center of the arch are in the same line. A rainbow is seldom seen at midday unless the observer stand on an eminence.

H. W. B., of N. Y.—Grain storehouses have been built of iron, as you propose. An establishment constructed on this plan, is described on page 182, last volume SCIENTIFIC AMERICAN, under the heading, "How grain is stored in New York."

L. W. M., of N. Y.—The simplest apparatus for determining the amount of rain which falls is a cylindrical vessel of tin; a common two quart pail will answer very well. The vessel is to be set where the rain will not be obstructed by trees, fences, or buildings, and after the shower the depth of the water in the cup is to be carefully measured. To facilitate the measuring, the water may be poured into a graduated glass to ascertain the bulk, from which the depth may be easily calculated.

C. H., of N. Y.—"Will the attraction of gravitation alone stop a pendulum?" No.

J. D. R., of N. Y.—We understand that the only requirement by law concerning the composition of the alloy used for the new three and five cent coins is that it shall contain not less than twenty per cent of nickel. The alloy no doubt will be found valuable for other purposes.

D. B. T., of N. Y.—You will find an explanation of the gyroscope in Silliman's and Ganot's physics.

A. B. R., of Wis.—Iron pyrites or native sulphide of iron is now extensively used in the United States as the source of sulphur, in the manufacture of sulphuric acid. The best pyrites contains between 40 and 50 per cent of sulphur. The pyrites which contains much arsenic is of no value.

G. L. C., of La.—Water glass, liquid quartz, and silicate of soda, are different names applied to the same thing. The article is on sale in this city and you may procure it of any druggist who makes his purchases in New York.

M. M., of N. Y.—The working strength of a hempen rope 3 inches in diameter is 7,800 lbs. and its breaking strain is 26 tons.

M. M., of C. W.—Asphaltum or pitch is often used to make the vaults of the character you describe water-proof. There is no other cheap substance which answers its purpose so admirably. It is imperishable of itself and has no chemical action on the wood, stone or metal with which it may come in contact.

J. M. B., of Ky.—A commutator is the name of the device used in galvanic apparatus for changing the direction of the currents of electricity. The word is synonomous with pole changer. In the magneto-electric machine, the electricity is produced in waves in alternately opposite direction, and consequently the commutator is necessary whenever the electricity is to be used for the electrotype process, or for producing electro-magnets.

M. D. S., of Ky., and W. A. C., of N. C.—Good color may be given to electro-gilding and silvering by depositing an alloy with the battery. But the process is quite troublesome and uncertain; it is not much used in practice. A simpler and surer plan is to color the goods after the gold or silver has been deposited in the usual way. To give gold surfaces a rich orange tint, take saltpeter 5 parts, alum 2 parts, white vitriol 1 part, copperas 1 part. Pulverize very fine and mix. For use add to the powder sufficient water to give the mixture the consistency of cream, and into it dip the gilded article; or the mixture may be applied by means of a brush. The coating is allowed to dry on the goods, and then they are to be heated in an oven or on a plate of iron until gold becomes of the desired color; the longer the heat is continued, the darker the color. The articles are finally immersed in water to remove the coating. Another mixture used in a similar way is composed of verdigris, alum and beeswax, and turns gold to a reddish cast. To whiten silver surfaces, immerse in a saturated solution of borax, dry and heat till the borax is completely melted. The excess of borax may be washed away by dilute sulphuric acid.

R. N. L., of R. I.—The blue woolen cloth which 'crocks' is dyed with prussian blue. The latter is a powder and if you whip the cloth smartly you will see the color fly away as dust.

W. R. D., of N. H.—"Where is the center of motion of a wagon wheel rolling on the ground? My opponents contend that in a wheel revolving on its axle suspended, its center of motion is the center of the wheel, but the instant the wheel is allowed to rest on the ground with the wagon in motion, that the center of motion is changed to that part of the wheel which is constantly on the ground?" W. R. D. is on the right side of the question. The center of a revolving wheel is always a center of motion; for the rolling of the wheel on a plane or on a curve does not alter the relation of the wheel to the center. In the case of the wagon wheel rolling on a plane 'that part of the wheel which is constantly on the ground' is not the center of any actual curve. The particles of the wheel describe cycloids, but the centers of these curves are fixed points; each individual particle describes its own cycloid which has its peculiar center. All motions on the earth are relative, and a moving body may have two or more centers of motion. Thus the wagon wheel has a center of motion in itself, and others, at the center of the earth, center of the sun, and at the center of motion of the universe.

J. W. L., of N. Y.—The force given out by condensed air on expansion is precisely equal to the force which was used in the compression, provided that none of the heat of compression has been lost. The form of vessels used or the rate or manner of compression or expansion, do not affect the question one way or the other.

Business and Personal.

The charge for insertion under this head is 50 cents a line.

Manufacturers of clock work to run light machinery send address to A. S. Griswold, Pittsburgh, Pa.

Foundery and Machine Shop wanted at Coloma, Ill. See advertisement and address A. P. Smith, Sterling, Ill.

John M. Hill, Nashville, Tenn., wishes to communicate with parties who make Bedstead Fans driven by Spring Power.

The Bartlett Sewing Machine.—To correct an erroneous impression that may have been given to the public that the shape or form of the Bartlett Sewing Machine is the same as the Willcox & Gibbs Machine, or that there has been a contest in reference thereto, it requires these facts to be stated:

The United States Patent Office issued, among other letters patent for Sewing Machines to JOSEPH W. BARTLETT, *two* patents for "*new* and useful designs for Sewing Machines." One of these patents is for a *circular form* the same as that FIRST used in the Bartlett machines, the other for an elongated form, it being found that this latter form possessed *advantages over* the CIRCULAR form, giving greater space to the "work," etc., and from a similarity of the Bartlett patent CIRCULAR form to that of the Willcox & Gibbs, Mr. BARTLETT, therefore, being desirous to give as distinct a character as possible in the best form to his machines, determined, some fifteen months ago to adopt the use of the "long arm" form, caused the models to be made and their manufacture begun. They are to be seen at the General Office, No. 569 Broadway, New York.—[*Gazette.*

"We have examined the Bartlett Machines. The mechanism is of the simplest kind—found to be durable and noiseless; the stitch did not rip upon being tested, and is far superior to that of the 'cheap' Machines.—[*Scientific American.*

"These Machines have met with an almost unqualified approbation, and experts on Sewing Machines pronounce it the most simple, perfect Sewing Machine now in market. It gives great satisfaction in our establishment, where we have tested it thoroughly, and it is especially valuable because apprentices who never before worked upon a Sewing Machine can operate it at once."—[*Demorest's Magazine.*

EXTENSION NOTICES.

John Krauser, of Tylersburg, Pa., having petitioned for the extension of a patent granted to him the 30th day of August, 1853, and reissued October 11, 1864, for an improvement in cider mills, for seven years from the expiration of said patent, which takes place on the 30th day of August, 1867, it is ordered that the said petition be heard at the Patent Office on Monday, the 12th day of August next.

Oliver P. Drake, of Boston, Mass., having petitioned for the extension of a patent granted to him on the 30th day of August, 1853, and reissued the 13th day of November, 1864, for an improvement in apparatus for combining hydro-carbon vapor with air, for seven years from the expiration of said patent, which takes place on the 30th day of August, 1867, it is ordered that the said petition be heard at the Patent Office on Monday, the 12th day of August next.

LAW REPORT—IMPORTANT TRADE MARK CASE.

This is an action brought by Amasa B. Howe, brother of Elias Howe, Jr., praying for an injunction to restrain the defendant corporation, of which Elias Howe, Jr., is principal stockholder and president, from selling or advertising any sewing machine bearing the trade mark of "The Howe Machine," or "The Original Howe Sewing Machine," or any title in which the name "Howe" is used.

It appears that although Elias Howe, Jr., was the inventor and patentee, he permitted his brother, the plaintiff, to manufacture under his patent, and that large sums of money had been expended by the plaintiff in perfecting the machine. The decision in the case is based on the following grounds:—

First, Elias Howe, Jr., as the inventor and patentee, had the exclusive right to make and sell this machine.

Second, The license granted to his brother, the plaintiff, conferred on him the right to make and sell only, nor was this an exclusive right, nor did it give him the privilege to use the name of Howe as connected with it, but,

Third, The inventor retained his right to use his own name both on the machine and in connection with its sale, and the plaintiff as partner or agent could acquire no right to the name in opposition to Elias.

Fourth, By a special agreement made in the year 1862, any rights which may be supposed to have existed before that date were surrendered by the plaintiff.

Fifth, It is not denied that a party may take a name and apply it to a machine as a trade mark, but the rule does not apply when it is sought to deprive a party of the use of his own name as applicable to his own patent, and which he had previously used for the same purpose.

Sixth, The judgment is therefore given that the plaintiff is not entitled, on the evidence proposed, to an injunction.

CROSSING THE EAST RIVER.

Since last winter, when on account of floating or fixed ice communication between New York and Brooklyn or Williamsburgh was either cut off for hours or rendered insecure and precarious for days, there has been a desire, not bounded by considerations of the interests of capital, that some more certain if not more rapid means of intercommunication should be contrived. The annoyances of the past winter and early spring are not exceptional; they have been repeated from year to year until the patience of the public has become well nigh exhausted, and the demand is general that some surer means of communication between the metropolis and its most important suburb should be established. A charter for a bridge company was secured at the last legislative session, and we understand that preliminary surveys are now in progress on both sides of the estuary known as East River. The bridge to be constructed will probably be a suspension bridge, with one or two stories, and of a length between points of suspension exceeding that of any other on the continent. But vast as is this undertaking the approaches to the bridge proper, are hardly less in magnitude.

On the New York side they must stretch from the river bank nearly to the City Hall while on the Brooklyn side they reach to the intersection of Sands and Fulton streets. Of course property on the line of these approaches must be more or less injured by the darkening of the windows and the obstruction of travel on the streets. Then, again, if merchandize is delivered from warehouses on the streets lining the river, in order to be conveyed over the bridge it must be teamed a distance to reach the approaches nearly if not quite equal to the breadth of the strait the bridge itself spans. In such cases the present system of ferriage will be preferred, as probably in many cases of foot passengers. If to these obstacles be added the enormous cost of the bridge and the feeling of insecurity, which no course of reasoning and scarcely a demonstration could obliterate from the minds of the people, it would seem that some cheaper and more feasible plan might be adopted.

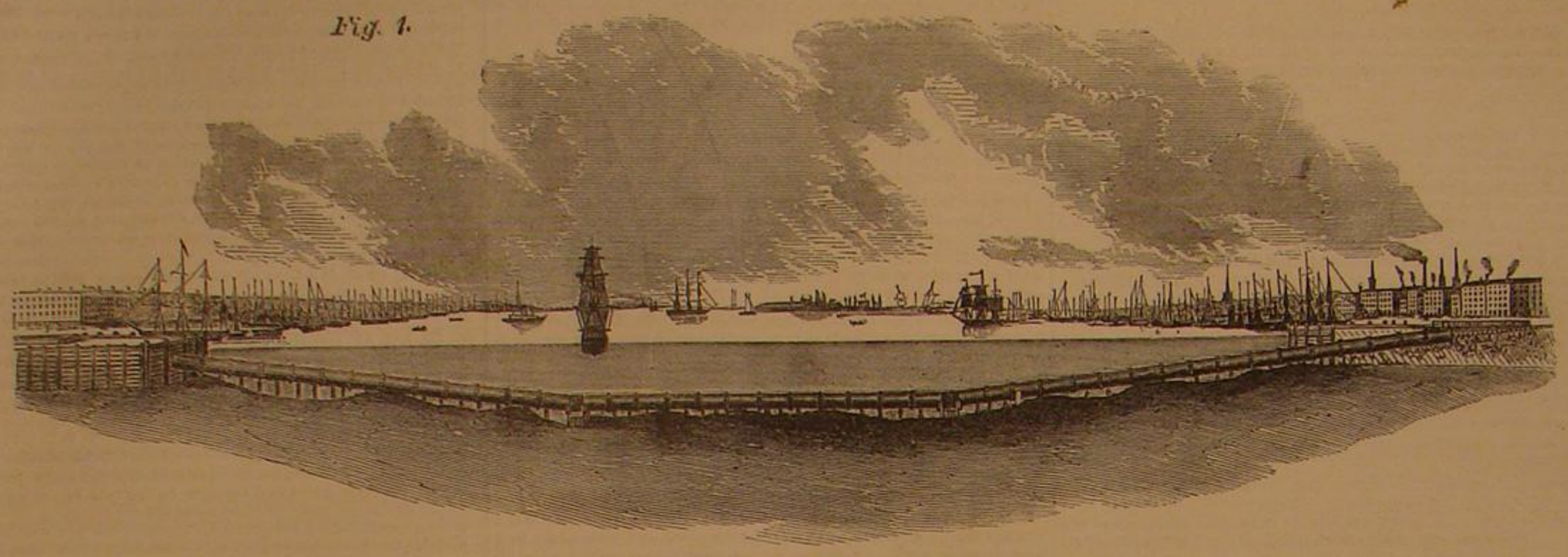


Fig. 4

As long ago as 1857 we published (*vide* SCIENTIFIC AMERICAN, Vol. XII., No. 30), a plan proposed by Mr. Joseph De Sendzimir, of South Oyster Bay, Long Island, by which a passage across the East River could be secured without a a structure exposed to gales and without approaches entailing travel of three times the width of the strait. It was, in brief, similar to that now in progress across the Thames at London for the Pneumatic Dispatch. The accompanying diagram shows the plan. It was a submerged tube of iron sunk in the bed of the river, the central portion level and the remainder rising gradually to either shore. In order to diminish the grade, the tube, on the Brooklyn side, where the natural descent is greater than on the other side, makes a curve or bend as seen in the diagram. The deepest portion of the river bed is only forty-seven feet below the surface at low water, and the tube may be either supported on piles driven into the bed of the river or lie upon a bed scooped for it so that the top may reach only to the surface of the bed. That this plan is feasible cannot be successfully denied; that it will offer no obstructions to navigation and the tides, and that it would be removed from danger of disturbance from floating ice and from gales is susceptible of proof. Its cost, estimated at only about $200 per running foot, is so much less than that of any bridge that twelve of these tubes could be laid for the cost of

MODE OF TUNNELING RIVERS.

Fig. 1.



intended to rest on foundations of piles and the corrugations are intended to strengthen the tube and also to provide for any expansion and contraction. Our opinion is that if the whole tube was built of corrugated iron, it would be immensely stronger and could also be made of thinner iron, thus reducing the cost.

The plan of building the tubes proposed is similar to that followed in the construction of the Pneumatic tube in London; that is that it be built in sections, the ends of which are made water-tight, and then the sections floated to place and sunk by admitting a sufficient quantity of water, to be afterward pumped out. The joints to be made by bolted flanges.

Fig. 2

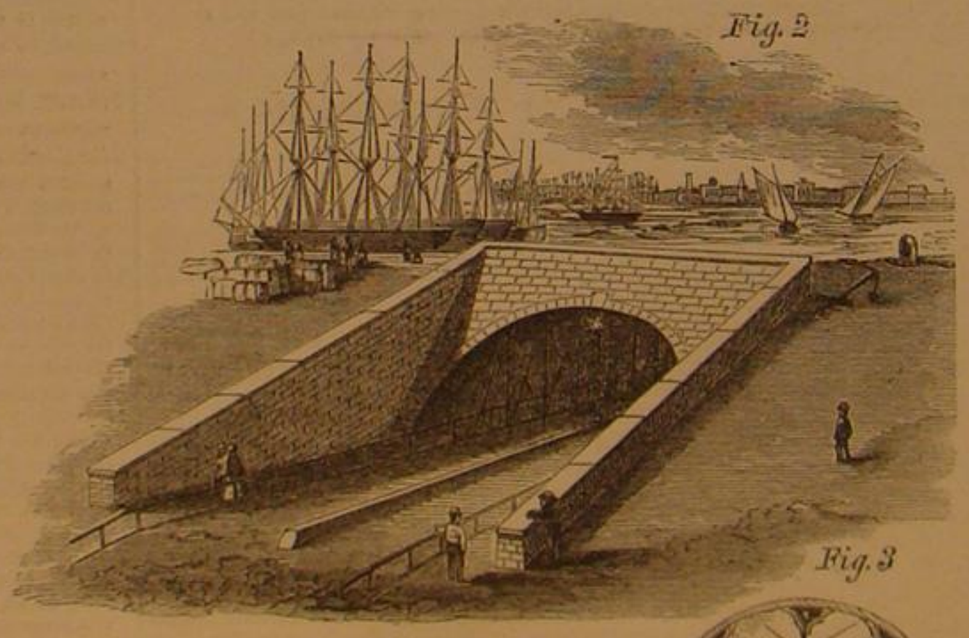


Fig. 3



We see fewer objections to this style of crossing rivers, especially when very wide or where a bridge must be very elevated, than to any other. If the tube is sunk in a bed dredged for it there can be no reason why it might not last for generations, especially if, like that of the Thames, it is protected externally by courses of brick masonry. We gave an engraving and description of that tube in No. 11, current Vol. No objection to the submerged tube, except the fact of its situation, would seem to obtain which might not be equally valid when urged against the elevated bridge. Certainly teams and street railway cars could as readily traverse the tube as the bridge. In either case there must be an ascent and a descent. But, beyond the fact of less cost in favor of the tube, there is the superiority in ease of approach and the consequent shortening of the distance. The two plans seem at least worthy comparison by those interested in the subject.

A New Smelting Furnace.

The works of the Star Glass Company, of Philadelphia, about to be started in Norristown, are furnished with a new style of furnaces with closed ash pits, in which is introduced a blast of air to support combustion with jets of steam in close proximity to the grate bars. The oxygen of the steam combining with the carbon of the burning fuel forms carbonic acid, and in passing through a thick bed of burning fuel it receives another equivalent of carbon and is converted into carbonic oxide; jets of air are forced into the furnace, over the fire among the products of combustion, the oxygen of which unites with the liberated hydrogen, carbonic oxide, and other inflammable gases, producing a clean, intensely hot flame. Nothing is permitted to escape but the incombustible gases. With this furnace it is thought that iron of superior quality can be made from ore with any kind of raw coal, and less than half the quantity used in ordinary furnaces. The cost of the furnace is not over fifteen per cent of that of ordinary furnaces. The ore is desulphurized, deoxydized and carbonized before melting, the sulphur and gas in the coal being decomposed and consumed before contact with the materials to be melted.

APPLICATIONS OF PAPER.

The uses of compressed vegetable pulp, or artificial wood, already very numerous, are multiplying. Among its good qualities, its low conductivity is important and but imperfectly appreciated. Many have seen, and verified by experiment, the statement that the warmest kind of bed comforter can be made by basting old newspapers together. Something in this line might be made a valuable new article of manufacture. Cisterns and water pipes of prepared paper, with a sufficient ingredient or else coating of insoluble substance, have been brought into use in England, for their remarkable resistance to the penetration of frost; or more accurately, their remarkable retention of the heat of their contents. It is stated that at the Albion Works, England, there was in the open yard a large brick tank containing several tuns of water, the ice in which was several inches thick during the severe cold of the past winter. By the side of this was another tank, made of paper boards, the water in which was not the least frozen. Some iron pipes which supplied water to the places in consequence of the freezing of the water which they boiler of the engine house from a large cistern burst in several contained. Some paper pipes, on the other hand, filled with water, and which had been exposed to the snow on the ground, kept the water from freezing. In a model house or hut, made of paper, some water in open bowls and pails did not freeze, though outside the building there were large masses of ice. The manufacture of paper pails has been initiated in this country, and we see no reason why they should not make a superior article. Sugar molds are now made of paper, by the same parties (American Papier Maché Co., Green Point, L. I.) and Messrs. Havemeyer & Elder, the noted sugar refiners, speak in the highest terms of a lot of 4000 of these molds which they have used for a year, preferring them to iron. An all-paper hat is coming into market, as we hear. Paper substitutes for starched linen are in common use, but what shall we say to paper shirts, drawers and hose, for which a patent has been taken out? Is the whole series of metallic ages, silver, gold, brass and iron, to wind up in an age of rags?

Velocity per Hour.

The speed of our ocean steamers in crossing the Atlantic rarely exceeds 11 miles per hour; the speed of river steamers is from 14 to 24 miles per hour; of a race horse from 29 to 30; of a bird 50 to 60; of a high wind 20, and of a hurricane 80 miles; of sound 804; of mechanical force in air 750; of the earth around the sun 68,000; of light, as demonstrated by Foucault's apparatus, 690,000,000 miles and yet this inconceivable speed is little more than half the velocity of static electricity which latter Wheatstone has shown to be 1,040,000,000 miles an hour.

If the earth were a cannon ball shot at the sun from its present distance, and with the velocity it now travels, and if simultaneous with the explosion a telegram was sent to the solar inhabitants, the electricity would pass the intervening space of 95,000,000 miles and the message be received in five minutes; the earth would be seen coming toward them after the lapse of eight minutes; the inhabitants would have nearly two months to prepare for the shock, which would be received over ten years before they heard the explosion.

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THEORIES OF THE STRUCTURE OF IRON.

A highly suggestive paper on the structure of iron was read at a late meeting of the South Wales Institute of Mining Engineers, by M. M. Vivian, Esq. Mr. Vivian's somewhat novel data invite careful testing, and if confirmed, the theory to which they appear to lead would become an interesting subject of discussion, strikingly in harmony with the present tendency of speculation in physics. He asserts positively, from a wide and protracted range of microscopic study of the metals in their various conditions, that they are invariably found (according to previous treatment) in one of these two kinds of molecular formation: either angular and crystalline, or cellular: the fibrous condition being a mechanical modification of the latter, showing under the microscope an ellipsoidal extension and concatenation of the cells, which are at the same time flattened and laminated upon one another like scales, or links in a flattened chain.

We lately quoted a theory which attributed the fibrous condition of wrought metals to the interposition of slag which became minutely flattened and lengthened out within the structure, by the process of manufacture, so as to separate the mass longitudinally into fibers. The more usual and plausible explanation of this condition is that by stretching and doubling a tenacious mass very many times over, a multitude of fresh surfaces are successively formed and brought into contact, which, not being in a state of fusion, cannot mingle their particles, but adhere superficially, with a certain distinctness or separation preserved; so that the mass is made up of minute parallel strips, coherent but not consolidated or mingled, and possessing each in itself the flexibility which is found in a fine thread even of the most brittle substance; while their limited cohesion to each other allows a certain flexible play within the mass, as in bending a bundle of rods. It will be seen that these theories are all ductile enough to be run into each other as one, with a little mutual accommodation, supposing Mr. Vivian's microscopic observations to be correct. Granting the flexibility of puddled iron to be accounted for by the usual explanation above given, it is a question whether some other cause must not be sought for its increased tensile strength. And again, the unsurpassed flexibility and tenacity of Bessemer steel remain quite unaccounted for by the ordinary theory. So that there is unquestionably room for inquiry on this subject.

No metal is ever really solid, and all good malleable iron is "as porous as a sponge." Mr. Graham's researches have shown that the metals absorb and retain mechanically, various proportions of different gases, in their cellular spaces. Mr. Vivian makes the interesting statement, from his own observations, that the best known conductors of heat and electricity, such as silver, copper and iron, have the most perfectly cellular structure, and their conductive power varies in accordance with the variations of this condition. His idea is that the cells afford a vacuous channel for these forces: which is not as philosophical as to suppose that the forces are forwarded by the continuity and elasticity of the cellular partitions.

As to the cause of the exchange of the crystalline for the cellular (or else amorphous) structure, and *vice versa*, the present state of inquiry (for science there is none) allows a variety of conjectures. In the state of fusion, the molecules of the structure are partially liberated by the separative force (heat) from the force of cohesion or gravitation to one another. At the same time the ultimate contents of the molecules themselves may be affected likewise, so as to assume the natural form of matter in freedom (or rather in action, through the force of heat) which is spherical. From this modification of their form and loosening of their cohesion, results fluidity, or the smoothness and freedom with which the molecules roll over one another. Mr. Vivian attributes the alleged cellular formation to an equilibrium of the opposing forces of expansion and contraction, but as these act in exactly opposite directions, the result of their equilibrium would be rest, at a single point of time. If at that point of time the molecular form were fixed beyond disturbance from the further progress and predominance of the contractile force, the result might be a globular, but not necessarily a cellular structure. If on the contrary, the withdrawal of the caloric and ascendency of the contractile force be violently accelerated, it is conceivable that the globular molecules might be riven by an irregular conflict of forces in straight lines, producing a formation in planes, or crystals. The alleged cellular condition of the globular molecules would remain to be accounted for, by enclosed gases for instance—a cause apparently not of sufficient universality—or else by some undiscovered law.

This brings into play Helmholz' new theory of "wirbelbewegung," or vortex motion. Supposing it a law of caloric force (or, as we more habitually regard it, fluid freedom) in matter, to produce motion in circles, we have at once a clear cause for the alleged cellularity, and a clear necessity, both for its maintenance—in case the heat-motion be not suddenly overcome and the arched condition of the matter be enabled to sustain itself without violent opposition until it grows turgid and finally rigid—and on the other hand for its disruption in planes of cleavage, in case the contractile force be suddenly and violently accelerated. This account of the process, if true, would also account for the brittleness of the ruptured and crystalline structure, as well as for its density and hardness. The crystalline or "short" quality of iron worked too hot, would also be explained on the same principle—the sudden contraction from the sudden escape of heat, coöperating perhaps with mechanical force, to rupture the cells or arches at the critical moment of consolidation. We shall not be understood, of course, as advocating any of the actual or supposable theories, which we repeat only by way of information and stimulus to inquiry.

According to Mr. Vivian's observations, the walls of the metallic cells, being smoothly formed and inaccessible to oxidation, are exceedingly brilliant, and reflect light from innumerable facets, when the mass is fractured. As before said, by rolling they are supposed to be flattened out like links, into chains or fibers, and by drawing as wire, this effect becomes still more marked. If then the bar, or especially the wire, be broken short off at right angles, it shows a dull gray color, because we look into the cells lengthwise, and the light is but faintly reflected from their depths. On the other hand, where the bar shows a longitudinal fracture, slightly bent to one side, the most lustrous effects are seen. Mr. Vivian thinks that the tensile strength of wire is reduced by repeated annealings during the process of drawing, in consequence of ruptures of the cells by expansion. If his views are correct, the test of iron and steel which he recommends, by examining the molecular structure with the microscope, when sufficiently understood, would become of great value.

THE COMMISSIONER'S DILEMMA.

We publish in another column a letter from a subscriber setting forth the cause of the delays at the Patent Office, and the reason the Commissioner does not increase the examining force. The Commissioner is to be commended for his forcible though unsuccessful appeal to Congress to give him more room, and for his subsequent effort to get possession of space occupied by other departments which have no right in the Patent Office building, and which ought not to have been allowed to quarter there at first. These various bureaus which absorb so much room needed by the Patent Office, and for the want of which inventors are suffering throughout the land, are like squatters: they have no business to remain, but are difficult to get rid of when once settled. Now what is the remedy? Until Congress assembles—when we hope the Commissioner will again lay his grievances before it, backed by the influence of one hundred thousand inventors in the shape of a petition—the cases in the beautiful Model Hall might be placed nearer together and light partitions constructed, forming rooms for the temporary use of an increased examining force. They might not be so convenient for the purpose as the rooms on the first floor adjoining the Library, Drawing and Record Rooms, but they would certainly be as eligible as those rooms in the basement, and much more cheerful and healthy for the occupants. Any expedient should be resorted to, rather than to have the inventive genius of the country discouraged by lack of desirable room or want of sufficient force to keep the work of the Office up.

We hope to see some immediate action taken by the Commissioner to remedy the evils which have existed too long already, and which are daily increasing. Come, Mr. Commissioner, do devise some way of obtaining room and appoint new or promote some of the most efficient assistants to be first Examiners. Sub-divide some of the over-crowded classes and require that the back work of the Office shall be brought up at once, and when once up, make it incumbent upon the Chief Examiner in each class to keep it so, and if he is unable to do it, to report the reason of his inability when he makes his monthly statement, that a further division may be made, or some other mode devised for his relief.

THE NATURE OF THE PHOTOGRAPHIC IMAGE.

The solution of this problem has for years engaged the attention of scientific observers, and a variety of explanations have been given. One of the most recent theories is that light acts upon the sensitive plate by a sort of mechanical pressure, in proof whereof it has been shown that if an object be pressed against the sensitive film, in the dark, the image of the impressed object may be at once developed, by the use of the usual developing agents.

But by far the most clear and satisfactory explanation of the phenomenon is that presented by M. Carey Lea, in the last number of the *Philadelphia Photographer*, which we publish in another column. Dr. Lea's contributions to chemical photography are widely known for their excellence and accuracy. The beautiful theory now made known by him is the result of a long series of laborious experiments.

THE DAY LINE IN CONGRESS.

In our discussion of the question, When and where the day begins, we ventured the prediction that the subject would some time engage the attention of national legislatures. Our prediction is being fullfiled sooner than we expected. The following is an extract from a recent speech of Senator Sumner delivered on the occasion of the purchase of Russian America:—

Another change must be made without delay. As the settlements of this coast came eastward from Russia, bringing with the Russian flag Western time, the day is earlier by 24 hours with them than with us, so that their Sunday is our Saturday, and the other days of the week are in corresponding discord. This must be rectified according to the national meridian, so that there shall be the same Sunday for all, and the other days of the week shall be in corresponding harmony. Important changes must follow of which this is typical. All else must be rectified according to the national meridian so that within the sphere of our common country there shall be everywhere the same generous rule and one prevailing harmony. Of course the unreformed calendar, received from Russia, will give place to ours; Old Style yielding to New Style.

The fact to which the Senator alludes is a very curious one,—when we cross the boundary of Russian America we come into another day. There is evidently a need of legislation in this case. But the learned Senator, like some of our correspondents, befogs himself. He appears to imagine that the beginning of the day has some connection with some meridian already established. What does he mean by "national meridian?" There was once an attempt to establish the meridian of Washington for the reckoning of longitude; but that meridian is very little used in practice and it has no relation whatever with what we have called the day line. Moreover, Mr. Sumner appears to attach an unwarranted meaning to the well known expressions, Old Style and New Style. These expressions properly refer to the reform of the calendar instituted by Pope Gregory XII. in 1577, when ten days were dropped from the old reckoning.

THE REGULATION OF TEMPERATURE AND MOISTURE.

All extremes of heat and cold, moisture and dryness, are injurious, but for short periods the human system can easily resist an influence from which injurious effects are experienced after a protracted exposure. Thus the workmen around furnaces never experience from an intermittent exposure the injurious effects to which men are subjected who work on hot summer days in the continuous radiation of the sun and sometimes fall victims to sunstroke.

Short exposure to cold will not produce that injury to a healthy person which follows when portions of the body are thoroughly cooled off and the natural perspiration checked for some time. It is an error to think it better to cool off gradually than to go from a hot fire at once into the cold. On the contrary, when before going out on a very cold day we warm up well before a good fire, and immediately wrap up in a coat or shawl, we find that we can resist the cold much better and longer than when we cool off before going out. It must be noted, however, when we remain in a place which is very warm so long that our perspiration becomes as free as it naturally is in the summer season, and then at once go out into the cold, there is danger of taking cold by the sudden check produced in a perspiration which was too free for the winter season. The artificial heating must therefore be moderate, or if strong, it must be of short duration. A thorough cooling off of the body below a certain standard of temperature (which is somewhat different for different individuls) will surely produce disease, which also will be different in its nature according to the different predispositions of the individuals: thus, by the same exposure to cold one will get a catarrh in the head, another become hoarse in the throat, another will have his respiratory or digestive apparatus disturbed, still another will be visited by rheumatism or neuralgia, etc., and it is one of the duties to be attended to during our material existence here on earth *to know ourselves* in this respect also, in order to guard against the weak points in our constitution.

As healthy as is wet and moisture, when we are exposed to it for a very short period of time (witness the use of baths, etc.), just as injurious is it when protracted beyond reasonable limits. Even when the moisture is only in the air in great excess, it is injurious to live in this air, as is proved by the unhealthfulness of low, damp localities, whether in a temperate or hot climate: such a damp air will always be a continuous check to the perspiration, as it does not absorb the invisible moisture which is always passing off the whole surface of the body, and which is so readily removed by dry air. Besides this, a damp atmosphere is very favorable to the generation and development of the fever-producing miasma.

But the most dangerous enemy we have to contend with in our climate is the extreme dryness of the air in the winter season. Cold air has much less capacity for absorbing moisture than warm air, while the general evaporation of course supplies less moisture for the atmosphere to absorb in winter than in summer. Now when we heat this cold dry air in our rooms in winter, we increase its capacity for watery vapor, and consequently its relative dryness. In this condition the air powerfully absorbs the moisture from all surfaces, those of the skin, throat and lungs not excepted. The air of every room should be supplied with moisture from the evaporation

water in connection with the stove or furnace. For a middle-sized room the evaporating surface should be about half a foot square. Unfortunately many furnaces and stoves are not provided with this arrangement, and where they are, too often the addition of water is entirely neglected, and the consequence is that the inmates of the place live in an atmosphere so dry as to injure their respiratory organs, produce pains in the throat, or rush of blood to the head, increase all kinds of pulmonary trouble, etc. On the other hand, an excess of vapor from keeping the water too hot may produce a deposit of moisture on the walls, and prove injurious. This is easily guarded against. To steam coils a small stop cock may be attached, from which by operating it a small amount of steam may be discharged from time to time: when not neglected, this is an excellent arrangement.

In many churches and public buildings in our cities, and even in private residences, this deficiency of water in the heating apparatus is very evident in the effects it produces on delicate lungs and throats, and this dry air is often made worse still by being heated in contact with the red-hot iron of the stoves. The air should not be scorched by contact of a small surface of red hot iron, but it should be heated by a more prolonged contact with a larger surface of iron moderately heated, and always come also in contact with tepid water, which will correct the drying effect of the hot iron and make the air more congenial to the moist surface of the throat and lungs.

GLEANINGS FROM THE POLYTECHNIC ASSOCIATION.

The seasonable subject of the ice manufacture first engaged the attention of the members of this club at their last regular meeting held on the 6th inst. Prof. Vander Weyde proposed a new plan for freezing water on a large scale. Most ice machines ever invented depend for their succeseful working upon the principle that any liquid forced to evaporate draws the heat which is absorbed during the process, from the most available source. If now ether, or other volatile liquid, under the exhausted receiver of an air pump is rapidly vaporized, it draws from water with which it is placed in contact, its latent heat, and the latter is thus chilled, and in time frozen. The cost of the evaporating liquid hitherto employed, has made the manufactured ice very expensive. Prof. Vander Weyde proposed using chimogene, one of the products from the distilling of petroleum, for this purpose and stated that ice could now be made so cheaply that it must come into practical use, rather than depend upon an uncertain and variable natural supply.

Dr. Bradley at a previous meeting had described a plan for preventing boiler incrustations by making the boiler form part of an electrical circuit, having the poles of a Daniell's battery connected with its ends. He cited on this occasion, two instances wherein his plan had been tried, and in both cases boilers using Croton water, and having incrustations one eighth to three sixteenth inches thick, were entirely freed in less than five weeks. He also offered a hypothetical explanation of the causes and process of removal. One of the members claimed that only two even well attested cases alone were not sufficient to prove the plan effectual or not.

Mr. Maynard exhibited a new wooden street-pavement that had come under his notice, and believing the principle a good one he wished to make it public For facility in removal for the purpose of repairing the sewers, gas mains, or water pipes, this pavement is made in blocks one foot square. The surface is grooved like the Nicolson pavement, to a depth of seven or eight inches, but unlike that pavement the blocks are cut in two directions at right angles so that a firm footing may be obtained by the horses in crossing streets paved in this manner. The crevices are filled with the usual composition of tar, pitch, and gravel. This plan it was stated, has been heartily approved by the engineer of the Croton Board.

Two weeks since the question was raised at a meeting of this club, whether the water of this city acted, or not, on lead pipe. To test the matter Mr. Read purchased 150 feet, filled it with the water and sealed it in the presence of the Secretary of the Institute. At this meeting after the expiration of twenty-four hours, the seal was removed and the water when tested with sulphuretted hydrogen gave evident traces of the presence of lead. The pipe used was new and it is well known that an insoluble coating becomes formed on the inside after using it for a short time, but the result showed that in the large number of houses fitted with new pipe every year, thousands are annually poisoned in this way. Moreover the slightest jar, even the turning of a faucet, it is asserted will separate this coating and the action of the water will then recommence.

At the close of this discussion a vote of thanks was tendered Prof. Tillman for the able manner in which he had presided over the meetings of the past year. The meeting then adjourned until the second Thursday in September.

ONE CENT A MILE.

The united management of the Hudson River and Harlem Railroads has undertaken to extend its sway over the river also, with a view to maintaining fares at its own figure, by means of a notification to the steamboat proprietors that any movement in the reduction of fares on the river, should be met by a reduction of the railroad fare to $1 50: the intention of course being to "fight it out on that line" until the steamboats are run off the river or brought back to fares agreeable to the railroad interest. The steamboat men are tough and plucky, and those who remember when passengers were carried to Albany for twelve and a half cents by steamboat competition, before the railroad was thought of, have no fear that the mighty Hudson and its navigators are to become an appanage of a railroad company.

Origin of Petroleum.

There have been numerous theories proposed to account for the production of mineral oils; among which the following is advanced by Professor Wilbur in a lecture at Hamilton, C. W. He believes that oil has been formed from marine vegetation, just as coal has been formed from land vegetation. Seaweed has a large proportion of oily carbonaceous matter, and few persons have any adequate conception of the immense growth and deposit of this product in the ocean bottom, every year. Each crop, after fulfilling its term of growth, becomes detached and sinks to the bottom, naturally accumulating in the hollows or pockets. As it is a received opinion among geologists that this portion of the North American continent was once the bed of a salt-water ocean, the accumulated masses of seawead, after being covered with deposits of stratified rock, might with probability be supposed to have eventually the form of a hydro-carbon oil. Moreover, the Devonian rocks which contain these deposits, were also the rocks in which salt was found, in immense subterraneous reservoirs of brine, now condensed or saturated far beyond the saltness of the ocean. These two deposits, oil and salt, were thus brought closely together in point of geological time. The salt was allowed to be an ocean deposit, and if so the inference was fair that the oil was one also. Moreover, Berthelot has also suggested a new theory of the origin of petroleum. Acetylides are always formed when carbonic acid comes in contact with the alkaline metals at a high temperature. The earth is everywhere impregnated with carbonic acid, and Daubrée has recently shown good reason for believing that the terrestial mass contains melted alkaline metals in the interior. From the acetylides thus supposed to be formed, bitumen and tars are produced by the perpetual reaction of hydrogen, and at one of the stages, these reactions are capable of producing a series like the American petroleum.

THE SANDWICH ISLANDS.—The exhaustion of the native population which has been going on for a great number of years, seems to be accelerated of late. During the last six years, there has been a decrease of over 9,000. The death rate among the natives is now about 1,500 a year over the births; and with an increasing ratio, this decimation will work the extinction of the race in a quarter of a century. European, but more especially Californian enterprise already sways the development and the institutions of these islands, and the proximity and unequalled energy of our Pacific states must inevitably draw them at no distant day under the protection if not the possession of the Union.

A SELF-DISINFECTING CAR for the transportation of fresh meats, fruits etc., has been fitted up for an experimental trip, in the following manner: A small closet is placed in each end of an ordinary car, with apertures near the floor and roof, a deposit of ice at the top, and beneath this two shelves of wire, one covered with lime and the other with charcoal. The heated air at the top of the car enters the upper opening, is cooled by the ice and descends, passing through the disinfectants and becoming purified, and thus creating a constant current and circulation of air. The application of the apparatus to dwellings, chambers and sick rooms, is also contemplated.



ISSUED FROM THE U. S. PATENT OFFICE
FOR THE WEEK ENDING JUNE 4, 1867.
Reported Officially for the Scientific American

PATENTS ARE GRANTED FOR SEVENTEEN YEARS, the following being a schedule of fees:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Reissue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay $500 on application.

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

65,326.—GATE.—Philip M. Ackerman, Webster, N. Y.
I claim the loose sliding bar, D, having a suitable supporting head, H, in combination with the sliding gate, substantially in the manner and for the purposes herein shown and described.

65,327.—GATE.—J. B. Alexander, Washington, D. C., assignor to himself and James C. Duncan, Olney, Ill.
I claim a gate so constructed as to be suspended by chains attached to and wrapping spirally on the center piece, D, causing the gate to close of its own weight, or the same device composed of any other material, substantially as described and for the purpose set forth.
I also claim the pins, L and K, and the bores, R and Q, substantially as described and for the purpose set forth.

65,328.—SELF-LUBRICATOR.—John Bachelder, Norwich, Ct.
First, I claim the revolving plate, c, the conductor, d, the vertical flange, e, the hood, l, and the arrangement of the bar and strainer, g, in the dripping pan.
Second, The combination of the revolving plate, c, and the conductor, d, or its equivalent, all for the purposes herein described.

65,329.—TRUSS.—Horace R. Ball, New York City.
First, I claim the bar, B, pivot, e, link, D, and set screw, C, for regulating the lateral set or facing of the pad, A, all arranged and acting as herein shown and described.
Second, I claim the bar, B, socket, b, and set screw, g, in combination with the hoop, K, and pad, A, for regulating the vertical facing or set of the pad, as and for the purpose set forth.
Third, I claim a pad, A, having a bar, B, socket, b, pivoted to the end of the hoop, K, by a pivot, f, and set screw, l, for regulating the pressure of the pad upon the body, arranged substantially as herein shown and described.
Fourth, I claim the combination of the pad, A, bar, B, with a perforated fan tail, H, pivot, I, set screw, l, and hoop, K, for throwing the pad below or above the hoop, substantially as herein explained.

65,330.—MOP WRINGER.—O. C. Barnes, Stowe, Vt.
I claim the follower, D, with the jointed head block, g, in combination with the treadle bar, b, arranged and operating substantially as and for the purpose herein set forth.

65,331.—CAR COUPLING.—J. B. Behrens, Pearl, Ill.
I claim an improved car coupling formed by the combination of the peculiarly constructed bumper heads, A and B, jointed coupling bar, D, spring, E, supporting rod, F, uncoupling lever, G, and operating rod, H, with each other, substantially as herein shown and described for the purposes set forth.

65,332.—WAGON BRAKE.—C. G. Bennet and S. A. Drake, (assignors to C. G. Bennet), Farmer Village, N. Y.
First, We claim, in combination with the brake bar, b, the relieving or raising cam, C, constructed and operating as and for the purposes herein shown and described.
Second, Suspending the brake blocks, B, of wagons and other vehicles from an axial point located near that of the ground wheels, W, substantially in the manner and for the purposes herein shown and described.

65,333.—MANUFACTURE OF STEEL.—A. B. B. Berard, Paris, France.
First, I claim the peculiar arrangement or construction of a reverberatory furnace with a double movable sole plate, as hereinbefore described and shown in figs. 1 2 and 3.
Second, The interposition of a bed of fuel in the current of the gas, as hereinbefore described.
Third, The mode of action of the gas, of the steam, and of the air, on or in the interior of the metallic bath, in the manner hereinbefore described.
Fourth, The arrangements, above described, for causing the scoriae to act on the metal for eliminating the phosphorus and other injurious foreign matters therefrom, as hereinbefore described.
Fifth, The reaction of heat from the oxidizing sole plate on the reducing sole plate, as hereinbefore described.
Sixth, The arrangements for operating at will by way of oxidation and reduction, successively, for purifying cast iron and for its reduction into steel or iron.

65,334.—HAME STRAP.—Martin T. Briggs, Schoolcraft, Mich.
I claim a jointed metallic hame strap composed of three parts, A B and C, constructed and operating substantially as set forth, and provided with a holding device to lock and retain the parts in holding positions.

65,335.—MEASURE OF LIQUIDS.—Parcell Brinkerhoff, Chillicothe, Mo.
First, I claim the central tube, C, having index levers, E F, spirally arranged perforations, b, in combination with the tube, B, of the vessel, A, having corresponding perforations and graduated top, G, and operating substantially as described for the purpose specified.

65,336.—STEAM ROTARY VALVE.—R. F. Brown, Savannah, Ga.
I claim the arrangement of the induction passage, C, eduction passage, D, with reference to the passages, C C, and valve, B, substantially upon the principle and in the manner as herein set forth.

65,337.—CHURN POWER.—James Budd, Pittsford, N. Y., assignor to himself and J. W. Briggs.
I claim the lever, B, in combination with the churn and the wheel, W, when the said lever is provided with a variable axial point with relation to the roller, r, as shown at f, substantially as and for the purposes set forth.

65,338.—BOLT AND RIVET TRIMMER.—M. D. Budd, Roscoe, Ill.
I claim the combination of the spring, g, the clasp, d, and the guide, b, arranged substantially as described.

65,339.—MACHINE FOR SHOTING METALS.—W. Butcher, Jr., Sheffield, Eng., and Thos. Shaw, Philadelphia, Pa.
First, I claim the employment of a rotating disk for the purpose of throwing molten metal off in particles, as set forth.
Second, The employment of configurated heat-enduring substances, for the purpose described.
Third, The introduction of water passages, substantially as and for the purpose set forth.

65,340.—WEATHER STRIP.—Charles E. Butler, Hudson, N. Y.
I claim the elastic weather strips formed by combining with the slotted strips, B, the slotted plates, C, screws, D, and springs, E, all made and operating substantially as herein shown and described.

65,341.—TINNERS' STOVE FOR HEATING SOLDERING IRONS.—C. A. Buttles and James Cowles, Milwaukee, Wis.
We claim dividing the interior of the stove or fire pot, by a perforated division or partition plate, d, in combination with the divided exit flue, e, and its damper, g, substantially as and for the purpose described.
We also claim the bent arm and weight, k m, in connection with the hinged lid, E, as and for the purpose described and represented.

65,342.—PROTECTOR FOR CAR WINDOWS.—Henry G. Carr, Lewistown, Pa.
I claim the self-acting grooved protector, constructed and operating as herein described and for the purposes set forth.

65,343.—BASIN PLUG.—William S. Carr, New York City.
I claim the plug for waste waterways, provided with an elastic disk, and guided in the manner as and for the purposes set forth.

65,344.—TRUNK.—E. P. Carter, Arcade, N. Y.
First, I claim as an improvement in the construction of trunks and valises, forming the hinges by connecting the ends of the incircling bands of the cover to the incircling bands of the body, substantially in the manner set forth.
Second, Providing the front ends of incircling metallic bands of trunks and valises with links for the reception of connecting straps, as and for the purposes shown and described.

65,345.—STEAM AND WATER-HEATING APPARATUS.—Alanson Cary, New York City.
I claim the combination and arrangement within the case, D, of one or more series of inclined steam cases, A, united together at their edges by means of the angular plates, and connected by steam pipes, B, each plate provided with air tubes, C, passing through them, the tubes in the lower series not being in the same vertical plane with the tubes in the upper series of cases, substantially as described and for the purpose specified.

65,346.—PRESS OR COVER FOR TUBS OR BARRELS.—Hiram L. Chase, Bath, Me.
I claim the combination of one or more eccentrically pivoted arms, C, or their equivalent, with the cover or press, A, substantially in the manner herein shown and described, and for the purpose set forth.

65,347.—GUARD FOR CIRCULAR SAWS.—J. W. Clark, Iola Kansas.
I claim the saw guard, B, provided with the self-adjusting drop, c, and suspended on the vibrating frame, D, constructed and operating substantially as and for the purposes herein described.

65,348.—SELF-LUBRICATING HANGER AND BOX FOR SHAFTING.—Wellsly W. Crane, Auburn, N. Y.
I claim, First, The adjustable hanger, when constructed substantially as above described, so as to adjust both on the vertical and horizontal planes, as above set forth.
Second, The combination of the vertical and horizontal joints above described, when used for the purpose and constructed in the manner, substantially as above specified.
Third, In combination with the above joint, I claim the self-lubricating box, when used as and constructed substantially in the manner specified.

65,349.—CONSTRUCTING SELF-LUBRICATING PULLIES.—Wellsly W. Crane, Auburn, N. Y.
I claim, First, The chamber, F, above described, when used substantially in the manner and for the purpose above specified.
Second, Constructing the internal or shaft bearing, A, independent of the main portion of the pulley, as and for the purpose above described.
Third, Feather-edging the ends of the pulles, for the purpose and in the manner above set forth.

65,350.—PLASTER SOWER.—F. P. Cullom, Dowagiac, Mich.
I claim, First, The construction of the hopper of a plaster sower of stationary ends, a a, stationary inclined side, b, reciprocating slide, c, and pivoted adjustable side plate, b', substantially as described.
Second, The corrugating of the inner surface of the slide, c, in combination with the corrugated side plate, b', and means for regulating the discharge of plaster from the hopper, substantially as described for the purpose set forth.

65,351.—BRICK MACHINE.—J. B. Curtis, Hillsdale, Mich.
I claim the inclined planes, J, carriage, K, and molding boxes, S, as arranged, in combination with the clay box, L, jack mold, M, and follower, N, when operating conjointly for the purpose and in the manner set forth.
The arrangements of the shafts, D G, cranks, E H, arm and link, Q R, in combination with the carriage, K, for the purpose and in the manner substantially as described.

65,352.—DRYING LOAVES OF SUGAR.—William Morris Davis, Philadelphia, Pa.
I claim forming a loaf of sugar with a hole through or into the interior of the loaf for the purpose of expediting the operation of drying sugar loaves.

65,353.—WATER DRAWER.—James Daykin, Cleveland, Ohio.
I claim, First, The pivoted head board, I, arranged in relation to the valve of the bucket, substantially as and for the purpose specified.
Second, The adjustable head board or plate, I, and tilting board, L, in combination with a chain or rope, E, valve rod, H, and bucket, D, when arranged and operating in relation to each other substantially as and for the purpose set forth.

65,354.—GATE.—John Dickason, Vevay, Ind.
I claim, First, The system of lever handles, n and n', connecting bars, o and o', and circular lever bar, D, in combination with the gate, A, all arranged and operating substantially as and for the purpose specified.
Second, In combination with the gate, A, and the U-shaped lever bars, E and E', which operate the cranks, f and m, the connecting bars, e and l, and the vertical lever, F, and circular lever bar, D, arranged and operating as described.
Third, The adjustable screw bolts, b and d, circular lever bar, D, or its equivalent, the post, C, and gate, A, arranged substantially as herein described and for the purpose specified.
Fourth, The latch, G, consisting of the latch bar, c, secured to the spring, p, by the clamping strap, p', and the hand lever, r, as described and for the purpose set forth.

65,355.—HAY AND STRAW CUTTER.—John H. Dickinson, Chicopee Falls, Mass.

I claim a device for cutting hay and straw wherein the cutter shall rise and fall on the arc of a circle, using for that purpose the levers, C C, the cutter, A, the connections, F, the shaft, G, and the swing catch, K, in combination.

65,356.—APPLICATION FOR SOFT METAL BEARINGS FOR WAGON AND CARRIAGE BOXES.—George W. Disman, Upper Sandusky, O.

I claim making carriage boxes by first preparing soft metal rings of copper or of a composition of which copper is the basis, and placing said rings upon a sand, or other core, and laying them in a properly prepared mold, and running molten cast iron on or around said rings, as and for the purpose described.

65,357.—PLOW BEAM.—Walden Eddy, Greenwich, N. Y.

I claim, First, Forming the adjusting bolt, B, solidly upon and out of the forward end of the plow beam, A, substantially as herein shown and described.

Second, Securing the rear end of the draft bar, F, in the space between the bars, a1 and a2, of the plow beam, A, by a bolt, G, passing through an eye or hook, f2, formed upon the rear end of the said draft bar, F, substantially as herein shown and described and for the purpose set forth.

65,358.—SAW SET.—James E. Emerson, Trenton, N. J.

I claim, in combination with the stock or swage head, the adjustable or movable lips for giving to the tooth of the saw the shape or form herein shown and represented.

65,359.—GATE.—B. Homer Fairchild and Emery Sadler, Farmington, Mich.

First, We claim the latch, D, constructed substantially as described in combination with the post, A, and projecting bar, c', of the gate, C, substantially as herein shown and described.

Second, The pivoting attachment, E F G, constructed substantially as described in combination with the post, D, and the upper horizontal bar, c', of the gate, substantially as herein shown, described and for the purposes set forth.

65,360.—MACHINE FOR DRIVING NAILS.—Dennis L. Falardo, New York City.

I claim the revolving wheel reservoir, d, formed and fitted as described to the tube, A, in combination with the tubo and the machinery connected therewith, in the manner and for the purposes set forth in this specification.

65,361.—MODE OF RECOVERING WASTE ACID FROM REFINING PETROLEUM.—Oliver W. Farrar, Pittsburgh, Pa.

I claim the improved process of diluting the spent acid of oil refiners with weak sulphuric acid, as and for the purpose herein specified.

65,362.—WASHING MACHNE.—M. S. Fellows, Livonia, N. Y.

The arrangement of the roller, F, hinged pounder roller, D, corrugated concave, B', and dash board, d, in connection with the fountain or supply chamber, w, as and for the purposes set forth.

65,363.—CONSTRUCTION OF SEWERS AND DRAINS.—Daniel H. Fernald, Bangor, Me.

I claim the adjustable indexed former, D, substantially as and for the purposes specified.

65,364.—FIREPLACE.—John U. Fiester, Winchester, Ohio.

I claim the combination of the plates, D and E, key, a, when constructed and arranged as described and placed over an open fire grate, the parts operating as set forth and for the purposes described.

65,365.—BUILDING BLOCK MACHINERY.—A. L. Finch, Sing Sing, N. Y.

First, I claim constructing the mold for building blocks of a detached metal frame with a lining of plates of steel held in place by screws passing in from the outside of said frame, in the manner and for the purposes specified.

Second, The slide, l, that removes the pressed block and brings the loose material into position for being pressed in combination with the stationary knife for equalizing the thickness of the block, as specified.

Third, A movable board applied to the side of the mold frame as specified in combination with the slide, l, and stationary knife, for the purposes and as set forth.

Fourth, The arrangement of the slide rods, 5 and o, and cams, p q 7 and 8, for operating the feeding slide, l, and giving a vertical motion to the mold bed, substantially as set forth.

Fifth, Connecting the gate of the feeding hopper with the mold bed by an adjustable connection so that the supply of material can be regulated and the gate be opened by the motion of the mold, as specified.

Sixth, The shaft, f, and the sectional gear, e, for raising the compressing hammer, c, in combination with the mechanism moved by the same shaft, substantially as specified for giving motion to the feeding slide and to mold bed, k, as set forth.

65,366.—SODA FOUNTAIN.—E. D. Finch, Stanton, Mich.

I claim the arrangement of annular refrigerating and non-conducting chambers, B C, inclosing a central ice chamber, D, and provided with faucets, F and H, for the purposes explained.

65,367.—BEEHIVE.—E. A. Floyd, Mrcomb, Ill.

First, I claim a beehive consisting of an outer case, A, resting close on a bottom board and an inner case, B, having its lower portion consisting of a strip of smooth metal with its edge fitting tight on the bottom board with the covered passage way, n, leading from the outside to the inner case, as shown and described

Second, The pivoted bars, a, arranged to operate in connection with the cases, A and B, as described.

65,368.—KEG AND BARREL FOR PAINT AND OTHER MATERIALS.—Arthur L. Freeman, Manchester, England, assignor to Sewall S. W. Folsom, Boston, Mass.

First, I claim the fastening strap, g, made as a handle for the keg head and so as to be employed for fastening the head and the upper hoop to the keg, in manner as specified.

Second, The construction of the upper hoop in two sections, m n, connected by rivets or joint pins, as set forth, and so applied to the keg as to enable either or both of such sections to be turned up and used as a bail, as specified.

Third, The combination as well as the arrangement of one or more legs or arms, o o, with the keg and the said hoop made in two parts or sections, m n, such arm or arms and sections being applied together and to the keg by means substantially as specified.

Fourth, The construction of the staves or body of the keg or vessel with the annuler shoulder, i, and the head with the raised flanges and also with the fastening strap formed either with or without the handle as above mentioned; the flange by its elasticity serving to make a tight joint and the fastening strap to hold the flange and the rest of the head in place, relatively to the shoulder, as specified.

65,369.—MACHINE FOR WASHING SAND.—James French, Bellevernon, Pa.

I claim, First, Washing and elevating sand by a wheel working vertically or nearly so, in a concave trough, such a wheel being provided on its outer circumference with blades inclined to the plane passing through them and longitudinally through the axis of the wheel to which they are attached, substantially as and for the purposes above set forth.

Second, The method of elevating and discharging sand from one basin into another by carrying the sand up on the blades of one or more elevating wheels and washing it into another basin or cistern by a jet or jets of water playing on such blades, substantially as and for the purposes described.

65,370.—PROPELLER.—Herman Fromm, East New York, N. Y.

I claim the combination of a windmill and an ordinary horse-power with the screw shaft of a vessel, substantially as described for the purpose specified.

65,371.—WATCH.—H. Ganney, Louisville, Ky.

First, I claim securing the outer end of the balance sprig of a watch to a stud formed with two spring arms, C C2, having set screw, D, when arranged and connected together substantially in the manner described and for the purpose specified.

Second, Forming each arm, C C2, of brass and steel, substantially as and for the purpose described.

Third, Securing the outer end of the main spring of a watch movement to and within the barrel by means of a supplementary spring coiled in the reverse direction, substantially as and for the purpose specified.

65,372.—PORTABLE FENCE.—Manson F. Gibbs, Livonia, N. Y.

I claim locking the two vertical stakes or bars, C and E, together at the bottom by means of pins, c, or their equivalents, entering the bed plate, B, and at the top by passing the ends, e, through a suitable mortise in the diagonal brace, A, the foot of that being similarly locked to the bed, B, as and for the purposes set forth.

65,373.—CAR COUPLING.—M. F. Gibbs, Livonia, N. Y.

First, I claim the hinged bail, C, with its projecting cam or latch, D, in connection with the spring, s, substantially as and for the purposes shown and described.

Second, The combination of said spring bail, C, and the latch with the automatic "pin dropper," substantially as and for the purposes set forth.

65,374.—SEED BOX FOR GRAIN DRILLS.—Charles H. Godfrey, Stewartsville, N. J.

I claim the irregular cams, e, on the stirring shaft, D, of a seed box for grain drills, substantially as and for the purposes described.

65,375.—COOKING STOVE.—Wm. A. Greene, Troy, N. Y.

First, I claim, in combination with an oven front plate, a shelf plate, a, so constructed and arranged in respect to said oven plate as to form in connection therewith a hollow shelf plate, substantially as and for the purposes set forth.

Second, The detachable shallow shelf plate, a, applied below the grate and above the ash box, in combination with the front oven plate, B, and the perforated side plates, F, substantially in the manner and for the purposes herein described.

Third, The angular shelf plate, a, substantially as and for the purposes described.

65,376.—MAGIC ARROW TOY.—H. C. Griffin, Franklin, N. H.

I claim the elastic cord, B, attached to a forked or other suitable bar, A, and the notched arrow, C, all arranged substantially as and for the purpose specified.

65,377.—MODE OF DRYING GLUE.—George Guenther, New York City.

I claim the mode of drying glue by revolving or rotating metallic surfaces having their temperature raised either by steam or hot air, substantially as described.

65,378.—CLAPBOARD GAGE.—George Hall (assignor to himself and Wm. S. Waldron), Middletown, Ohio.

I claim the combination of the rule, B, with the gage plate, C, when hinged upon the handle, A, in the manner described and for the purpose set forth.

65,379.—WOOL-PACKING TABLE.—William S. Harris, Eckford Township, Mich.

I claim, First, The employment of longitudinal and lateral grooves in the upper face of the packing head, M, in combination with the notches in the table flaps to secure the baling twines, o, when said head is so arranged as to project above the surface of the turned down flaps, substantially as set forth.

Second, The abutment pins, F, in connection and combination with the flaps, F1 F2, for forming a top abutment over which the fleece may be tied both ways, substantially as specified.

Third, The use of the connected and jointed clamps, H H, in combination with the spring stops, S, for securing the table flaps when acting as a press box, substantially in the mode herein described.

65,380.—NUT MACHINE.—James Haslam (assignor to M. J. Coleman), Philadelphia, Pa.

I claim the catch, G, constructed and arranged substantially as described in combination with a nut machine, for the purpose set forth.

65,381.—BEEHIVE.—Joel Heacock, Marlboro, Ohio.

I claim the quadrangular sheet metal slide, E, fitting into the lower part of the hive, A, and sliding between guides, e* its bottom edges resting upon a stand or table between the feet, f, and provided with the entrance, g, substantially as described for the purpose specified.

65,382.—PESSARIES.—E. F. Hoffman, Poughkeepsie, N. Y.

I claim a pessary made wedge-shaped and provided with concave surfaces, b c, an elevation, d, and flat retreating surfaces, e, substantially as and for the purposes set forth.

65,383.—BRICK MACHINE.—James Hotchkiss and Ezra Russ, Springfield, Ohio.

We claim, First, The combination and arrangement of the driving cam, wheel, C, and rock shaft levers, E F, for operating the mold wheel and pressing toggles, substantially as herein specified.

Second, The combination of the pawl, H I, adjustable in length with the notches, J J, in the periphery of the mold wheel on their equivalents, substantially as and for the purpose herein set forth.

Third, The extension of the pug mill beyond the center of the mold wheel so that the latter may extend under the entire bottom of the former without diminishing the diameter of the same, substantially as and for the purposes herein specified.

Fourth, The employment of the bottom plate, V, of the pug mill as a bearing for the upper journal of the mold wheel the said plate being secured to the frame work by suitable projections, a a a, substantially as and for the purpose herein set forth.

Fifth, The central depressions, w, in top of the mold wheel when combined with the extension of the bottom plate of the pug mill downward therein for the purposes herein set forth.

Sixth, Forming the pressure plate, n, mortise or guide in an extension of the bottom plate, V, of the pug mill as set forth.

Seventh, The combination with each other of the mold wheel, W, the arc-shaped groove, m', in the bottom of the pug mill, the crescent shaped apertures, R, through the same, and the fillers, r r, arranged and operating together, substantially as and for the purposes herein specified.

Eighth, The employment of two scrapers, P Q, acting successively one while the clay is under pressure and the other after the clay is relieved from pressure, substantially as and for the purpose herein set forth.

Ninth, The movable scraper, A' acting in the opposite direction to that of the stationary scrapers, substantially as and for the purpose herein specified.

Tenth, The lowering of the followers so as to sink the bricks after being molded somewhat further in the molds to receive the pressure of the piston, substantially in the manner and for the purpose herein specified.

Eleventh, The adjusting screws, b' b, which support and adjust the followers in the mold when they are set in lugs, a' a' which project into the mold mortises, substantially as specified.

Twelfth, The construction and arrangement of the toggles, M M, with the spring, m, and operating upon each other by a cam action, substantially as herein set forth

Thirteenth, The vibrating tilter, T, when operated by a lever, U, and cams, T T, substantially as herein specified.

65,384.—SECURING WAGON SEATS.—Elias Hoxie, Montazuma, N. Y.

First, I claim the securing the seat to the wagon sill by means of two or more bolts, F, extending from the sill, A, to the sill, C, so that no holes are made in either for the said bolt to pass through, nor are they otherwise weakened as set forth.

Second, The bolt, F, in combination with the nut, D, and slotted plate, E, all made and operating substantially as herein shown and described.

65,385.—WHEELS FOR VEHICLES.—Elias Hoxie, Montzuma, N. Y.

I claim the metal ring, B, arranged around the hub, A, and provided with a zig-zag flange, C, substantially as herein shown and described.

65,386.—RUNNING GEAR FOR HARVESTERS.—Moses G. Hubbard, Syracuse, N. Y. Antedated May 26, 1867.

I claim the vertical handle, A, in combination with the cam, D, formed in the horizontal plate, B, and with that part of the gear designed to be moved or shifted out of gear, substantially as and for the purpose set forth.

I also claim the employment of the bolt plate, L, constructed as described for securing the bolts, substantially as and for the purposes specified.

I also claim the location and arrangement of the spring, G, upon the shifting lever and in relation to the shifting gear, substantially as and for the purposes described.

65,387.—MODE OF DESULPURIZING ORES AND EXTRACTING GOLD AND SILVER.—William W. Hubbell, Philadelphia, Pa.

I claim saturating the pulverized gold or silver ore with saltpeter, and uniting it with charcoal or carbon in other form and applying fire to desulphurize and desiccate the ore, to extract the precious metal, substantially as described.

65,388.—PADLOCK.—Henry Jackson, Brooklyn, N. Y.

First, I claim the guard, E', in combination with the tumblers, E, and plate, C, all arranged to operate in the manner substantially as and for the purpose set forth.

Second, The arm, F, in combination with the bolt, D, arranged to operate in the manner substantially as and for the purpose specified.

65,389.—RETORT FOR REVIVIFYING BONE CHARCOAL.—Gustavus A. Jasper, Charleston, Mass.

I claim as my invention, the improvement in the construction of either or both of the two retort sections, A' B' as described, in order that they may be connected by screw bolts, or screws and nuts as set forth, and the upper section, A' be rendered capable of being inserted into and withdrawn from the support plates, c d, as explained, each section under such improvement being contracted or made with a neck, h, and provided with ears, e e, or their equivalents, substantially as specified.

65,390.—PLASTER SOWER.—Gilbert Jessup, Shortsville, N. Y.

First, I claim effecting a parallel adjustment of the delivery or discharge plate, G, by means of the bent or anchor levers, h j and k, as set forth.

Second, Hanging the hopper, T, down between the carrier wheels, whereby it is balanced or nearly so upon the said wheels, substantially in the manner and for the purposes herein shown and described.

Third, The combination with the vibrating feed bar, D, having a serrated edge, the agitators, s, when their lower ends are connected loosely to the said bar, D, and the upper end of each alternate one is pivoted to the front side of the box, T, and the others to the rear, as shown and for the purposes specified.

65,391.—BOLT CUTTER.—Jesse Johnson, West Fallowfield, Township, Pa.

I claim the combination of knives, A and B, with levers, E and F, screw, D, frame, C, and top and bottom plates as in figs. 3 and 4, all constructed, arranged and employed in the manner and for the purpose shown and explained.

65,392.—GRATE.—William Keiser, Stroudsburg, Pa.

I claim the arrangement and combination of the parts, B and C, with the frame, A, substantially as described, also the straps, d, and the wrench, D, with the pins, h h', as and for the purposes set forth.

65,393.—MACHINE FOR MAKING PAPER HATS.—Henry Kellogg, New Haven, Conn.

First, I claim the combination of the annular piston carrying the pervious former, with the cylinder, and the means described or the equivalent thereof for controlling the water, substantially as and for the purpose described.

Second, The combination of the elastic couching pad, the annular piston carrying the pervious former and the cylinder, substantially as and for the purpose specified.

Third, The combination of the elastic couching pad, the annular piston carrying the pervious former, the cylinder and the means for stopping the couching pad to compress the fibers, substantially as and for the purpose specified.

Fourth, The combination of the elastic couching pad, the couching annulus, the annular piston carrying the pervious former, and the cylinder, substantially as and for the purpose specified.

Fifth, The combination of the means for automatically controlling the water in the cylinder, of raising and lowering the annular piston carrying the pervious former and the cylinder, substantially as and for the purpose specified.

And finally, the combination of the cylinder, the annular piston carrying the pervious former, the elastic couching pad, and the means for stopping the upward movement of the couching pad, substantially as and for the purpose specified.

65,394.—MACHINE FOR TURNING THE HEADS OF SCREWS.—Timothy Kennedy, Hamden, Conn., assignor to Thomas Kennndy, Branford, Conn.

First, I claim the combination of the cutter holder, B, with the cutter, E' and the cam, F, constructed and arranged so as to operate substantially in the manner herein set forth.

Second, The combination of the segmental cutter, E, having its cutting edge formed as described with the holder, B, said holder being arranged to move the said cutter around a central point into cutting position, substantially as herein set forth.

65,395.—SPRING FOR HOLDING CLOTH IN SEWING MACHINES.—Theodore E. King, Painesville, Ohio.

I claim the tension spring constructed substantially as herein set forth for the purpose described.

65,396.—SKATE.—Geo. V. B. Ladd, Boston, Mass.

First, I claim the combination of the sectional runners as specified with the recessed projection within which they are hinged or pivoted under the arrangement herein described so that the rocking motion of the runners shall be limited and stopped at certain points of the said projection or shoulder as set forth.

Second, The combination of the sectional runners and recessed projections within which they are hinged as described with the elastic foot rest, substantially in the manner and for the purpose set forth.

65,397.—COMBINED COVER LIFTER, HAMMER, ETC.—R. M. Lafferty, Three Rivers, Mich., assignor to himself and J. E. and J. P. Prutzman.

I claim the combination of the screw driver, E, tack drawer, G, lifter, H, hammer head, I, the corrugation, J, of the jaw, F, engaging with the extension piece, K, to form pincers knife sharpening plate, L, in one implement, constructed as herein described.

65,398.—MAKING CRYSTAL SHRED GOLD FOR DENTISTS.—Emile Lamm, New Orleans, La.

I claim the above process or any other process, substantially the same as specified.

65,399.—METHOD OF PREPARING GOLD FOR FILLING TEETH.—Emile Lamm, New Orleans, La.

I claim the use of all organic substences soluble in solutions of gold with the exception of saccharine substances for making crystallized fibrous gold by any process, substantially the same as that herein described for the purpose set forth.

65,400.—POST HOLE AUGER.—Thomas Leeson, Sharon, Wis.

I claim the combination of the spiral spring plate, C, and nuts, D and R, with each other and with the shank, A, substantially as herein shown and described for the purpose set forth.

65,401.—MEDICAL COMPOUND.—George H. Leithead, East Birmingham, Pa.

I claim a medical compound consisting of water, sugar, borax, gum arabic, laudanum or morphia or other similar opiate with or without alcohol about in the proportions named, and for the purposes above set forth.

65,402.—BEEHIVE.—Volney Leonard, Springfield, Pa.

First, I claim the plate, D, applied to the hive, B, in relation with the holes, g, as shown in combination with the fastenings or pivoted notched plates, j j, substantially as and for the purpose set forth.

Second, The moth trap composed of the grooved and notched strips, h, applied to the hive, substantially as shown and described.

65,403.—CARRIAGE TOP PROP REST.—H. W. Libbey, Cleveland, Ohio.

I claim the metallic sleeve, A, and cushion, B, combined as and for the purpose set forth.

65,404.—EVAPORATOR—Henry Lighty, Attica, Ind.

I claim the skimmer, G, when constructed and operated substantially as herein described and for the purpose set forth.

65,405.—STEAM GENERATOR.—William Lowe, Bridgewater, Conn.

I claim constructing cylindrical boilers commonly known as plain horizontal tubular or flue boilers with one or more openings in the sides or bottom of said boilers which shall communicate with a combustion chamber l side of the boiler, and connected by tubes or flues, with the back end of the boiler through which the products of combustion are made to pass substantially in the manner and for the purposes herein shown and described.

65,406.—SIFTER.—R. C. Ludlow, St. Louis, Mo.

I claim the combination of the batten a, head c, top e, and the sieve h, substantially as and for the purposes herein described.

65,407.—TOURNIQUET CLAMP.—John Lusk, Jr., Eckford, Mich.

I claim the tourniquet clamps (A,) provided with the guide lips (C,) and operated by thumbscrews (B,) substantially in the manner, and for the purpose herein described and set forth.

65,408.—FIRE ESCAPE.—Robert Mackenzie and James Cooper, New York City.

We claim the fire escape consisting of the inclined track ropes, C, C, their upper ends secured to the cross bar B of the window frame, their lower ends to the ground bar D, and forming tracks upon which the car E, slides to the latter, being guided by the ears a, a, fitting around said track ropes and operated by means of the hoisting tackle F, G, b, when all are constructed and arranged as described for the purpose specified.

65,409.—SAFETY VALVES FOR STEAM GENERATORS.—Carlile Mason, Chicago, Ill.

First, I claim the lever C, arranged substantially as and for the purposes specified

Second, The weight supporter D, E, provided with a spring k, substantially as specified.

Third, The catches, i, when so constructed as to remain in position when the weight is elevated by the main lever and so project when the weight is elevated from any external disturbance, substantially as specified.

Fourth, The arrangement of the spring, k, with the lever, C, or their equivalents so as to prevent the escape of steam whenever the weight is agitated from any cause, such arrangement being substantially as specified.

Fifth, The combination of the lever, C, and spring, k, with the lever, B, and weight, F, substantially as specified.

Sixth, the combination of the lever, C, rod or rods, c, and lever, B, with the valve, a, substantially as specified.

Seventh, The combination of the cylinder, D, cap, E, with the spring, k, and rod, h, substantially as set forth.

Eight, The combination of the weight supporter, D, E, provided with a spring, k, and catches i, lever, C, and rod, c, with the lever, B, cylinder, A, valve a, and weight F, substantially as and for the purposes specified

65,410.—RATCHET DRILL.—William Matthews, (assignor to himself and L. W. Eaton,) Bridgeport, Conn.

I claim the combination of the pawl, F, and dog, H, with the ratchet wheel G, when constructed and arranged to operate as herein described and shown.

65,411.—AXLE FOR WAGONS, &c.—F. McManus, Ellenburgh Centre, N. Y.

I claim winding the part of a wooden axle upon which the wheel revolves with metallic wire substantially as herein shown and described and for the purpose set forth.

65,412.—PLOWSHARES.—William D. Mendenhall, Farmington, Ill.

I claim the method of forming or shaping any plowshare or mold board, or both combined, with a concave surface of any desired radius and area extending from the breast (c,) of the plow towards the opposite side (d,) or in a line parallel, or nearly so, to the cut of the share.

65,413.—FELTING MACHINE.—S. S. Middlebrook, Sandy Hook, Conn.

I claim the combination of the endless aprons, C C', reciprocating and revolving at different velocities, as and for the purpose described.

65,414.—HANGING WAGON SEATS.—Henry F. Moore and James S. Blaisdell, (assignors to Henry F. Moore,) Medford, Mass.

We claim so attaching the hinges, C, to the body and seat of the wagon that the seat will be allowed to slide back and forth, substantially as and for the purpose described.

We also claim in combination with the above the pins, h, or their equivalents, for locking the seat, B, in place, substantially as set forth.

65,415.—FENCE.—Thomas Morris, McGregor, Iowa.

I claim the panels, A, and braces, C, constructed and combined with each other, substantially in the manner herein shown and described, and for the purpose set forth.

65,416.—FRUIT GATHERER—M. A. Morton and D. F. Morton, Angola, N. Y.

We claim a fruit picker constructed, arranged and operating substantially as herein set forth.

65,417.—CHURN.—John Neal, Sheboygan, Wis.

I claim the combination of the earthenware vessel, A, and the metallic bearing posts, H, substantially as set forth and shown, for the purpose of adapting revolving dashers operated by gearing to an earthenware churn

In combination with the dashers, F, the stripper, D, substantially as and for the purposes set forth.

In combination with posts, H, and earthenware vessel, A, the hinged cap, h, constructed and operated substantially as set forth.

Connecting the bearing posts, H, to the earthenware vessel, A, by passing a shank of the post through a vertical hole in a suitable lug or projection, and securing said shank by a screw nut, or its equivalent, substantially as set forth.

65,418.—BOILER FEEDERS.—A. F. W. Neynaber, Philadelphia, Penn.

First, I claim the construction of the valve, A, with reference to the orifice of pipe, B, whereby the steam is allowed to flow through pipe, B, for the purpose of blowing an alarm whistle attached to pipe, C, and raising the piston, D, substantially as set forth.

Second, The arrangement of valve, A', piston, D, lever, E, support F, weight, G, pipes, H and I, substantially in the manner and for the purpose as described.

65,419—PUMP.—William H. Noyes, Franklin, Penn.

I claim the pump herein described constructed with the collar, E', upon the plunger rod, E, valved plunger, C D, and a valve box, G, adopted to be removed by the plunger, C, and forced down into the converging pump barrel, A, by the collar, E', all substantially as and for the purposes herein specified.

65,420.—TIGHTENING AND LOOSENING WHEELS ON SHAFTS.—Leverett H. Olmstead, (assignor to Wright & Smith,) Newark, N. J.

I claim the combination and arrangement of the slide, B, screw y, and pin, or block, X, constructed and operating as described for the purpose of tightening or loosening wheels on shafts, as set forth.

65,421.—CENTER PLATE FOR STOVE TOPS.—P. Paradis and R Reilly, Rochester, N. Y.

First, We claim dividing the center plates of cooking stove tops transversely through the narrow portion and connecting them by loose or sliding joints, substantially in the manner and for the purpose herein shown and described.

65,422.—CENTERING AND SQUARING CHUCK.—Gardner R. Parker (assignor to Dodge & Wellington,) Worcester, Mass.

I claim the particular combination and relative arrangement of the head, A, slotted thimble, B, drill, a, and cutterr, A A,' substantially as and for the purposes above desribed.

65,423.—AUTOMATIC FEEDER OF BOLT BLANKS.—W. F. Parker, Meriden Conn.

I claim beveling the upper and slotted end of the vertically moving bar as described and shown, in order that the screw blanks may by the force of gravity slide off the end of said bar substantially as set forth.

65,424.—PUMPS.—Thomas Patterson, New York City.

First, I claim a pump having an oscillating piston, I, within the cylinder, A, which cylinder is provided with a partition or abutment, E, and connected with two channels, c, and d, all arranged substantially as described.

Second, The semicylindrical chambers, c d e and f, provided with the valves, g h i and k, and divided by means of a partition, E, all substantially as set forth.

65,425.—DUROGEL.—Cassius C. Peck and Francis E. Engelhardt, New York City.

First, We claim the use of bichromate of potassa with the addition of mineral acids such as sulphuric or sulphurous acid, and in combination with pentasulphide of calcium, or their respective equivalents substantially as and for the purpose herein set forth.

Second, The use of chloride of lime in addition and combination with common glue substantially as set forth.

65,426.—SUB-SOIL PLOW.—Rufus Peet, Carlile, N. Y.

First, I claim the combination of the parts, E F G H, with each other and with the upright, D, and standard, B, said parts being constructed and arranged substantially in the form and manner herein shown and described and for the purpose set forth.

Second, Forming a projection, d, upon the land side of the forward edge of the upright, D, substantially as herein shown and described and for the purpose set forth.

65,427.—MACHINE FOR DESTROYING POTATO BUGS.—Henry Pitchforth and William Benson, Muscatine, Iowa.

First, We claim the combination of the reel, P, hopper O, and rollers, K, with each other, substantially as herein shown and described and for the purpose set forth.

Second, Operating the rollers, K, from the drive wheel, C, by means of the gear wheels, E F N M L, substantially as herein shown and described.

Third, Operating the reel, P, from the rollers, K, by means of the band, R, and pulleys, S and T, substantially as herein shown and described.

65,428.—AXLE BOX.—William H. Pollard (assignor to James H. Gould), Seneca Falls, N. Y.

I claim the box, A, provided with the corrugations, a a, operating in connection with the hub, as herein set forth.

65,429.—TELEGRAPH SIGNAL KEYS.—Frederick B. Porter, Detroit, Mich.

First, I claim the supplemental point or its equivalent, for the completion of the circuit, O, connected, arranged, and operating substantially in the manner and for the purpose described.

Second, The additional spring, or its equivalent, R, arranged and operating substantially in the manner and for the purpose described, in combination with the above.

65,430.—DREDGING BOX.—G. W. Putnam, Peterboro, N. Y.

I claim the sprinkle, consisting of the vessel, A, having valve, E, and cross partition, D, forming compartments, B C, substantially as described.

65,431.—CHEESE PRESS.—William H. Ragan, Fillmore, Ind., assignor to himself and N. R. Jones, Terre Haute, Ind.

First, I claim the arrangement of the vertical screw, C, in the frame, A A, in combination with the elongated pinion, p, actuating it by means of the spur wheel, p', substantially as and for the purposes herein specified.

Second, The inclined bed, E, provided with level rails, d d, in combination with the platform, h, arranged and operating substantially as and for the purposes set forth.

65,432.—SHEEP SHEARS.—John Ralston, Slippery Rock, Pa.

First, I claim the cutter, C, when pivoted to the face of the cutter, A, and secured to the spring, B, substantially as and for the purpose herein shown and described.

Second, The stationary notched bar, A, when secured to the spring, B, in combination with the movable cutter, C, which is pivoted to the plate, A, and secured to the slotted end, e, of the opening, B, all as set forth.

65,433.—HARNESS PAD BLOCK.—William H. Rannels, Oakland Mills, Pa.

I claim the bow presser, B, having its legs curved outward and hinged to oblique staples, g g, in combination with the block, A, when constructed as herein specified.

65,434.—POTATO DIGGER.—J. C. Richardson (assignor to himself and William Simpson), Benton, Me.

First, I claim attaching the teeth, D, of the digger directly to the axle, A, of the machine, substantially as herein shown and described.

Second, Operating the digger to lift the potatoes from the ground by means of the lever, J, attached to the axle, A, substantially as herein shown and described.

Third, The combination of the screen, G, and receiving box, H, with the axle, A, and teeth, D, substantially as herein shown and described and for the purposes set forth.

65,435.—PUMP.—F. Richter, Milwaukee, Wis.

I claim the arrangement of cylinder B, plunger, L, valve chest, C, and valves, H, with the water passages and air chamber, K, as described.

65,436.—PAPER FOR THE MANUFACTURE OF LETTER AND INVOICE FILES.—John L. Rile (assignor to Asa Shipman), New York City.

I claim the preparation of paper and other similar sheets in the manner substantially as described and for the purposes specified.

65,437.—STEAM ENGINE.—Henry F. Roberts, Fayette City, Pa.

I claim the large steam cylinder, D, furnished with a piston and piston rod, and with the pipes, k and m, for admitting and discharging water alternately at its opposite ends, in combination with a high pressure steam cylinder, A, when such cylinders are connected together by exhaust steam pipes, f f', substantially as and for the purposes hereinbefore described.

65,438.—FEATHER-CLEANING MACHINE.—J. H. Sardam, Wellington, Ohio.

First, I claim the pipes, E, provided with holes, H, and valve, I, as arranged, in combination with the central pipe, E', and chambers, E F', for the purposes and in the manner as described.

Second, The chambers, F F', and pipes, E E', in combination with the cylinder, A, pipes, G and G', and faucet, R, as and for the purpose set forth.

65,439.—RAILWAY CHAIR—J. W. Shiveley, New York City.

First, I claim the recesses in the rail ends, in combination with a check bar which pits into said recesses, substantially as and for the purpose herein shown and described.

Second, I claim the combination of the longitudinal rib, f, its equivalent with the check bar, substantially as and for the purpose herein shown and described.

Third, Making the check bars, B and B, and central rib, f, one piece, with the chair, C, substantially as and for the purpose herein shown and described.

65,440.—HORSE AND CATTLE POKE.—Nelson Sylvester, Weymouth, Ohio.

I claim the spring, E, plate, F, and spikes, e, in combination with tongue, C, cross piece, D, pin, b, and bow, A, substantially as and for the purpose set forth.

65,441.—BREAD CUTTER.—S. D. Simmons, Brooklyn E. D., N. Y.

I claim the box, A, provided with two compartments, b b', in combination with the knife, B, having the bar, D, attached about at right angles with pivots, e, at its end, to work in bearings, f, and a slit or space, c, allowed at the top of the box for the knife, as it is brought down to work into the compartment, d', substantially as and for the purpose specified.

65,442.—ROLLER FOR BOARDING OYSTER DREDGES.—Thos. P. Sink, Fairton, N. J.

I claim the right and left hand screw roller, as attached to the guuwale of an oyster boat, for the purpose of boarding an oyster dredge, as herein described.

65,443.—MACHINE FOR MARKING CORN GROUND.—George Sprague, Spring Hill, Kansas.

First, I claim the hinged side wings, E E, with wheels, B' B', on their outer ends, combined with the truck frame, A, with wheels, B B, and levers, a a, arranged and operating substantially as and for the purpose described.

Second, The guide rod, d, on the tongue, D, and the measuring line, e, in combination with the truck frame, A, employed as herein described.

65,444.—ENGINE GOVERNOR.—Robert Stewart, Elmira, N. Y.

First, I claim the elliptical springs, E E, and hinges, c c, when attached to cross heads, C D, constructed and operating as described and for the purposes set forth.

Second, The weight balls, G, operating in combination with axes, e, and hinged springs, E, substantially as and for the purposes described.

Third, The combination and arrangement of the hinged springs, E E, and cross heads, C D, hollow shaft, B, and valve rod, A, constructed and operating as described, and for the purposes set forth.

65,445.—MATCH BOX AND CANDLESTICK COMBINED.—Curtis R. Stickney, Hartford, Conn.

First, I claim the combination of a match box and a self-acting candlestick, when formed of two parallel tubes, substantially as herein set forth.

Second, I claim the combination of the tube, e, with the outside shell, d, and the cover, D, substantially as herein described and for the purpose set forth.

Third, I claim the cover, D, having a receptacle for the wick of the candle, substantially as herein describ d.

Fourth, I claim the placing of the roughened surface, E, in such a position that one of the tubes shall serve as a guide for the match when passed over its surface, substantially as herein described.

65,446.—REVOLVING STAND FOR PICTURES.—Edwin B. Sturdevant, Germantown, Ohio.

First, I claim the rotary frame, g' g', pivoted in the manner described, when arranged upon revolving chambers, substantially as and for the purpose specified.

Second, The series of revolving chambers furnished with brackets, h h, and arranged to exhibit two or more tiers of rotary double picture frames, substantially as and for the purpose specified.

65,447.—LIFTING JACK.—Seman Taber, St. Joseph, Mo.

I claim the construction and arrangement of the pawls or dogs, F I, springs G M and i, levers, H, lifting hook, D, rack bar, B, and socket, K, in the handle, L, substantially as described for the purpose specified.

65,448.—FIRE KINDLER.—Verlin G. Tansey, Quincy, Ill.

I claim an improved fire kindler, constructed and arranged substantially as herein shown and described and for the purposes set forth.

65,449—VISE FOR HOLDING WOOD.—Isaac C. Tate, New London, Conn.

I claim the universal joint, D, constructed as described, consisting of the shank, A, arm, B, to which the cap lever, C, is pivoted, and adjusted by means of the set screw, b, adapted to support and adjust the ball, G, in any desired position, substantially as described for the purpose specified.

65,450.—WINDLASS FOR VESSELS.—Henry Thompson, Rockland, Me.

I claim as my invention the arrangement as well as the combination of the vibratory standard, F, and its roller, c, or the equivalent thereof, with the windlass, A, and one of its pawl cases, C C, so as to be operated by such pawl case, substantially in the manner and for the purpose as hereinbefore specified.

I also claim the combination and arrangement of the vibratory standard, F, its roller, c, or the equivalent thereof, the stay, G, and the connection bar, d, as described, the whole to be applied to the deck and windlass of a vessel, and the pawl case of such windlass of a vessel, substantially as and for the purpose hereinbefore explained.

65,451.—VENTILATING DOOR.—Theodore R. Timby, Saratoga Springs, N. Y.

I claim ventilating rooms by means of the holes, a, or slats, a', at the top or bottom of doors, provided upon each side with beveled or hollowed out deflectors, B or B', immediately above the said holes and projecting over them, substantially as herein shown and described.

65,452.—MOTOR REGULATOR AND REGISTER ATTACHMENT FOR ORGANS.—William H. Topham (assignor to himself and Peck, Brothers & Co.), New Haven, Conn.

First, I claim the combination of the plates, K K, with the plug, G, and cylinder, D, of the valve, substantially in the manner and for the purpose herein set forth.

Second, In combination with the plug, G, and its spindle, H, and bearing, I, the cap, h, and the nut or nuts upon the spindle, substantially as and for the purpose set forth.

Third, The combination of a regulator valve with an organ register, V, when constructed and arranged so as to operate substantially in the manner set forth.

Fourth, The combination of the rod, W, the register, V, and the rod, R, with a regulator valve and the bellows, when constructed and arranged so that the register operates substantially as set forth.

65,453—STEAM ENGINE.—J. F. Troxel, Bloomsville, Ohio.

First, I claim the special arrangement of the pistons, B B' B'', rods, C C', cross heads, G, and links, F, in combination with the lever, D, link, H, and crank wheel, I, for the purpose and in the manner substantially as described.

Second, The sliding valve, a, as arranged in combination with the pistons, B B' B'', and operated in the manner as and for the purpose herein substantially set forth.

65,454.—MAKING CAR WHEELS.—Samuel Vanstone (assignor to himself and John Stuart, Providence, R. I.

I claim constructing a car wheel by first forging or stamping the part, B, with the lugs, C, around the central hole, b, and then casting the hub thereon, substantially as described.

65,455.—FELTING MACHINE.—Enoch Waite, South Natick, Mass.

I claim the combination of the card cylinder, the feeding mechanism, the carrying aprons, and one or more felting tables, and the platen or platens thereof, working longitudinally of the machine, the whole being arranged substantially as described.

I also claim the combination of the transversely-grooved roller, N, the card cylinder, the carrying aprons, and one or more sets of felting beds or platins, arranged substantially as and so as to operate as specified.

I also claim the combination of one or more sets of felting platens, and mechanism for moving them transversely to the sheet of felt, with one or more sets of such platens and their mechanism for moving them longitudinally of the sheet of felt, the whole being substantially as and for the purpose as hereinbefore described

I also claim the combination of the feeding mechanism, the card cylinder, the two endless apron, the beds, and longitudinally and transversely-working platens, provided with machinery for operating them, substantially as described.

65,456.—MACHINE FOR FORMING BATS FOR FELTING WADDING, ETC.—Enoch Waite (assignor to himself and the Elliott Felting Mills), Franklin, Mass.

I claim the combination of the endless apron, C, and the feeding drum, I, of the auxiliary carding engine, by or with mechanism, whereby the speed of the said drum may be controlled by, or increased or diminished with that of the apron, substantially as and for the purpose specified.

I also claim the endless carrier and the striker made and arranged in manner and provided with mechanism for operating them, as described.

And I particularly claim the application of the projections of the striker to their bars by hinges, or mechanical equivalents therefor, in order that the projections may vibrate or move relatively to the bars, so as not to impede the motion of the carrier.

I also claim the combination of the endless apron, C, the feeding drum, I, and the doffer, H, by or with mechanism whereby the speeds of both the drum and doffer are varied with that of the endless apron, the same being for the purposes or objects explained.

65,457.—KILN FOR RE-BURNING AND PURIFYING BONE BLACK.—Adam Weber, New York City.

First, I claim the columns, A', having cast upon their upper ends the plates, s, in combination with the angle plates, p p, supporting the fire bricks, q q, the bed plates, a a, and ash pan, L, substantially as described for the purpose specified.

Second, The arrangement of the inclined partitions, h h, between the single retorts, D D, and cast upon them and between the fire spaces, k k and m m, in the rear of said retorts, substantially as described for the purpose specified.

Third, The horizontal fire flues, K K', and dampers, n n, in combination with the retorts, substantially as described for the purposes specified.

Fourth, The hanging rods, c, extending in sections from front to rear under the coolers, and suspended from the plates, a, by means of the hangers, d, arranged to support a series of retorts, as herein set forth for the purpose specified.

Fifth, The suspended iron ash pan, L, in combination with the furnace, C, substantially as described for the purpose specified.

Sixth, The flanges, v, cast upon the upper ends of the lower sections of the retorts, E, arranged in such a manner as to form partitions between the upper retorts and lower retorts, E and E', substantially as described for the purpose specified.

65,458.—APPARATUS FOR THE MANUFACTURE OF VINEGAR.—Wendelin Weis, St. Paul, Minn.

I claim the vinegar apparatus which is constructed so that the vinegar and the air pass in zigzag lines over and around shelves, B, in opposite directions to each other, and which is provided with hot and cold air pipes, and with removable end boards or such that can be opened, all substantially as and for the purpose herein shown and described,

65,459.—LAMP BURNERS.—Abel Whitlock, Danbury, Conn.

I claim the flexible strap, B, in combination with the screw, F, or its equivalent for the purpose set forth.

65,460.—PLATE LIFTER.—John B. Willett, West Meriden, Conn.

I claim the combination of the handle, A, the lever, D, and hooked arms, C, three or more constructed and operating substantially in the manner as herein set forth.

65,461.—COFFEE POT.—Edward F. Woodward, Brooklyn, N. Y.

I claim the detached fountain percolator constructed as described consisting of the taper metal tube, A, upon the inverted cup, B, and supporting the cylindrical cap, C, with the perforated bottom, through which the taper tube, c, passes, tube I, cap D, with the perforated plate, g, tube, E F, branch tubes, h', cup top, F, and cover k, combined and operating substantially as described for the purpose specified.

65,462.—APPARATUS FOR DESTROYING MOTHS.—Charles F. Worch, New York City.

First, An apparatus for destroying moths that is made and operated substantially as herein shown and described.

Second, The device for regulating the heat in the box, A, consisting of the box, E, pipes, G and H, dampers, a a and c, and door, F, all made and operating substantially as shown and described.

Third, the use of air-tight boxes in which racks or shelves, B, are arranged for holding furniture and clothing from which all the moisture is removed without an excessive heat.

65,463.—STEAM ENGINE LUBRICATORS.—John Ashcroft, New York City.

First, I claim the lid, or cover, (B) constructed and operating in the manner substantially as shown and described, and for the purpose set forth.

Second, The combination of cover, (B) and cup (A) constructed, arranged and operating in the manner substantially as shown and described and for the purpose set forth,

65,464.—PRESSES.—Henry B. Barber, Scott, N. Y.

I claim the sliding plate, C, with its pails, a c, and eccentric lever, D, when used in combination with the rack bar, B, and follower, D, and frame, substantially in themanner and for the purpose set forth.

65,465.—PIPE AND STUD WRENCHES.—Joseph B. Barnes, Fort Wayne, Ind.

First, I claim the handle, (a) when the back portion of the upper end shall be provided with a rack in combination with jaw (c) as and for the purpose specified.

Second, The pawl, (d) spring, (e) all combined and operated as and for the purpose described.

65,466.—LIGHTING GAS BY ELECTRICITY.—E. E. Bean and W. H. Mumler (assignors to themselves and Nathaniel Cummings), Boston, Mass.

First, We claim, in combination with the escape wheel, p, the arm, n, rock shaft, f, and the detent, c, when constructed and operated in the manner substantially as described.

Second, We also claim the non-conducting sleeve, H, having the wires, l m, imbedded therein, in combination with the tip of the burner, substantially as described.

Third, We also claim imbedding the wires, l m, in a sleeve, H, of non-conducting material, surrounding the tip of the burner, or in the non-conducting tip of the burner itself, substantially as and for the purpose set forth.

65,467.—LAMP CHIMNEY.—John Bellerjeau, Philadelphia, Pa.

First, I claim the metal chimney, E, when supported by upright bars, D, and secured to an annular plate, C, substantially as and for the purpose herein shown and described.

Second, A lamp chimney consisting of the lower glass or transparent chimney, F, and an upper metal chimney, E, which are so arranged that the same do not come in direct contact with each other, substantially as herein shown and described.

Third, The glass chimney, F, in combination with the metal strips or bars, D, arranged inside of the glass chimney substantially as herein described, for the purpose specified.

65,468.—TOILET POWDER.—Innocent Antony Bergrath Nashville, Tenn.

I claim the manufacture of this particular toilet powder, and from the material as herein set forth.

65,469.—STONE CHANNELING MACHINE.—Virgil W. Blanchard, Bridport, Vt.

First, I claim the employment of a hinged frame when used substantially as and for the purpose set forth.

Second, The employment of one or more chisels, or one or more saws, to which a rotary motion is given for the purpose of channeling petrous substances, when attached to a hinged frame, substantially as described.

Third, The employment of a hinged frame to which are attached an elevating arm or arms and springs, as and for the purpose specified.

Fourth, The employment of a feed apparatus in combination with a hinged frame, substantially as and for the purpose described.

Fifth, The tooth rack, L, on the track upon which the frame rests, in combination with said frame, substantially as set forth.

Sixth, I claim further the employment of the lever, I, cog wheel, H, when used as and for the purpose specified.

Seventh, In combination with the above I claim the screw shaft, E, substantially as and for the purpose set forth.

65,470.—ROTARY VALVE FOR STEAM ENGINES.—P. Bloomsburg and J. Molyneux, Bordentown, N. J., assignors to Bordentown Machine Company.

First, We claim a rotary valve composed of the disk, F, with its passage, f, and opening, h, and the disk, D, with its opening, t, in combination with the within described ports in the valve face of the cylinder, and the intermediate disk, E, with its openings, j and j', the whole being constructed and operating substantially as and for the purpose herein set forth.

Second, The disk, F, and spindle, G, with its vertical slot, g, in combination with the disk, D, the tubular spindle, H, and its spiral slot, and the adjustable collar, I, the whole being arranged for altering the relative positions of the said disks, substantially as set forth.

65,471.—APPARATUS FOR STACKING HAY AND GRAIN.—Wm. F. Browne, Washington, D. C.

What I claim as my invention and desire to secure by letters patent is the combination and arrangement of the elevated sheltering platform, the mast with its elevating crane, and the ladder for ascending the mast or stack, substantially as and for the purposes herein specified.

65,472.—TREMOLO ATTACHMENT FOR MELODEONS, ETC.—R. W. Carpenter, Brattleboro, Vt.

I claim the attachment to a melodeon or other wind instrument of like character, of a rotary tremolo valve or swell, constructed to form an intermittent cut-off to the current and arranged to control the same in its action on the reeds, substantially as specified.

65,473.—MAKING STEEL DIRECT FROM ORE.—Thomas J. Chubb, Brooklyn, N. Y.

First, I claim treating purified iron sands or mechanically purified ore, by preparing, mixing, forming, or packing it into lumps, balls, or cylinders, and afterward deoxidizing, carbonizing, melting, casting, and hammering or rolling the same at one or continuous though varying heat, substantially as described.

Second, The combination of the furnace, A, with the melting pot or chamber, A', constructed and arranged for deoxidizing, carbonizing, converting, and melting iron ore into steel or metal having some of the properties of steel, substantially as described.

Third, Preparing, mixing, and forming iron ore into lumps, balls, or cylinders, and packing the same into casings made of clay, cast or sheet iron, or any suitable material, for the purpose or purposes specified and substantially as described.

Fourth, The employment of a long, narrow nearly horizontal or slightly inclined chamber, A, so constructed that ore, in the form of lumps, balls, or cylinders may be fed in at one end of the said chamber or furnace, and discharged at the hollow end in the form of steel sponge, chemically changed as to the volatile matter combined with or contained in the said ore or metal, substantially as described.

Fifth, The employment of a long narrow chamber, A, so constructed that it may be opened or closed at either end by gates or their equivalents, for the admission of the substances to be melted or converted into cast steel or similar metal, and for the admission and discharge of air and gases, and for manipulating with bars or otherwise the substances under treatment therein, said chambers being also provided with a tap hole, and suitable movable partitions, or their equivalents, substantially as described.

Sixth The arrangement of a mold chamber, H, in combination with a melting chamber, A', substantially as and for the purposes described.

Seventh, Converting purified iron sands or mechanically purified iron ore into steel sponge or into a deoxidized spongy mass, by aid of a gas or gases arising from a gas generator when the same is passed through a reheating operation, substantially as described.

Eighth, The combination of a gas generating furnace or apparatus, or passage leading therefrom, a gas and air heating or a heat reclaiming or regenerative furnace and apparatus with a chamber or chambers employed for chemically changing the volatile matter combined with iron ore, or iron sponge, substantially as described.

Ninth, The combination of a gas generating furnace or passage leading therefrom and a reheating or regenerating furnace, and apparatus with a mold chamber, H, for the purpose of heating or reheating the chamber, the mold or ingot or casting therein, for the purpose or purposes specified and substantially as described.

Tenth, The employment of intensely heated molds for casting ingots therein, when employed for retaining the heat in the castings preparatory to and for hammering or rolling the same, substantially as described.

Eleventh, The employment in a heated mold while casting or pouring the melted metal therein, of gas or gases for excluding the atmospheric air therefrom, substantially as described.

Twelfth, The combination of a gas generating furnace, or apparatus operated in connection with a gas and air heating or a heat regenerating apparatus, with a deoxidizing and carbonizing furnace or chamber for the purpose of heating the same, substantially as described.

Thirteenth, The combination of a gas generating furnace operating in connection with a gas and air heating or a heat regenerating apparatus, with a deoxidizing and carbonizing furnace or chamber, for the purpose of heating the same, substantially as described.

Fourteenth, The combination of a gas generating furnace operating in connection with a gas and air heating or regenerating apparatus with a melting chamber, furnace, or pot employed for melting or reducing steel sponge and deoxidized sponge or carburet of iron in the form of sponge into cast steel or metal similar to or having some of the properties of cast steel, substantially as described.

Fifteenth, The combination of a gas generating furnace or apparatus, or passage leading therefrom, with a stationary chamber for deoxidizing magnetic proto or per oxide of iron containing or not the oxide of tetanium or other metal or refractory matter.

Sixteenth, The combination of a gas generating furnace or apparatus, or the passage leading therefrom, with a stationary chamber for reducing, heating, or melting of deoxidized sponge or ore in the form of sponge.

Seventeenth, The combination of a gas generating furnace or apparatus, or passage leading therefrom, with a chamber for heating molds or the castings in the chamber in which they are formed.

Eighteenth, The combination of a gas generating furnace or apparatus, or passage leading therefrom, with reheating tubes or a chamber containing heated tubes constructed for and applied to the deoxidizing, heating, melting, or reduction of ores or metallic substances containing iron and in the form of sponge, before, during, or after such treatment or treatments, substantially as described.

Nineteenth, The employment of a heat reclaiming or a heat regenerative furnace or apparatus in combination with a chamber employed for heating a vessel or crucible containing iron ore or metallic sponge, converting, cementing, and melting the same into steel.

Twentieth, The combination of a heat reclaiming or heat regenerative furnace or apparatus with a stationary vessel or chamber or chambers employed for converting, melting, and cementing steel or metallic substances into steel.

Twenty-first, The immersion of steel sponge, or carburet of iron sponge, into a bath of molten steel or metal similar in nature or quality to the sponge, so that the sponge may be melted and also a homogeneous liquid mass formed of it and the metal constituting the bath, substantially as described.

65,474.—COFFEE CAN AND CRUSHER.—Daniel C. Colby, Washington, D. C.

I claim combining with a coffee canister a grinding or crushing device of any desired structure, substantially as described and set forth.

65,475.—BEVERAGE.—Wm. Davis, Portland, Me.

I claim the compound of ingredients herein specified for a beverage, as set forth.

65,476.—CAN AND BOX FOR PAINTS, ETC.—Frederick W. Devoe, New York City.

I claim the groove, a, external rib, b, and gasket, c, arranged in relation with each other and with the upper part, a*, of the body, A, and the rim, b*, of the cover, substantially as herein set forth for the purpose specified.

65,477.—CAN OR BOX FOR HOLDING PAINT.—James F. Drummond, New York City.

I claim, First, The circumferential groove, a, in combination with the overlapping rim, d, of the cover, and the soldered joint, a', substantially as herein set forth for the purpose specified.

Second, The external circumferential rib, b, arranged with reference to the groove, a, rim, d, and soldered joint, a', substantially as herein set forth for the purpose specified.

65,478.—HAY LOADER.—Wm. H. Elliot, New York City, assignor to Lowell L. Johnson, Binghamton, N. Y.

First, I claim the combination of the swinging frame, g, or its equivalent, a lifting rope, m, and an elevating fork, so arranged that the loaded fork will operate the frame to produce the necessary friction to raise the load while said frame will drop, and the elevating mechanism cease to act, when the fork is unloaded.

Second, The combination of the lifting rope, m, swinging frame, g, pulley, h, belt, k, and tightening pulley, l, arranged and operating substantially as described.

Third, The stop, m', upon the rope, m, in combination with ring, n', and swinging frame, g, for the purpose of decreasing the friction at the proper moment, so as to hold the fork suspended, as set forth.

Fourth, Constructing a tripping fork so that it may be released for the discharge of the load by simply turning its handle and pressing against the same.

Fifth, The combination of the spring catch, r, head, p, and handle of the fork, substantially as and for the purpose set forth.

65,479.—STEAM GENERATOR.—Henry Feyh (assignor to himself, George T. Emery, and Wm. B. Hawkes), Columbus, Ohio.

First, I claim the arrangement of inclined pipes or cylinders of different diameters or capacities, communicating as described, for the purpose of producing a forced circulation of water in all parts when exposed to the action of heat, substantially in the manner described and shown.

Second, The arrangement of pipes, G and H, with pipes, D and E, the end of said pipes projecting outside of the furnace walls, substantially as and for the purpose described.

Third, The arrangement of ball couplings, J, and pipes, G G H, said pipes being of different diameters and in communication with one another by means of the chamber on which the ball joint seats for the pipes are formed, substantially as and for the purpose herein described.

Fourth, A steam superheater, A, in conjunction with a steam generator operating upon the principle substantially as specified.

Fifth, A steam receiving chamber, B, in combination with a series of pipes of different diameters connected together at their ends and arranged substantially as described.

Sixth, The combination of pipes, G and H, with pipes, D E, substantially in the manner and for the purpose described.

65,480.—MACHINE FOR HULLING RICE.—Edmond Theodore Ganneron, Paris, France.

First, I claim the arrangement of the suction chamber, I, and its nozzles or passages, H, with relation to the cylinders, C D F G, for operation substantially as specified.

Second, The valve, N, in combination with the chamber, I, for regulating the draft through the passages, H, without varying the velocity of the fan or other device producing the suction.

65,481.—APPARATUS FOR ANNEALING WIRE.—Henry C. Gee, New York City.

First, I claim the fluted chambered cylinder, A, with hollow journals, B B, perforated pipe, E, and jacket, C, all arranged and operating substantially in the manner and for the purpose set forth.

Second, I claim in connection with the above the annular, i i, in the cylinder, A, and the stationary fingers, c c, substantially as and for the purpose herein described.

65,482.—STUMP EXTRACTOR.—Hugh M. Gibson, Grand Rapids, Mich.

First, I claim the arms, C C, lever, A A, connecting bars, B B, and pawls, O O, all being combined, arranged, and operating as and for the purpose specified.

Second, The roller, D, hooks, G G, ratchet wheels, K K, pawls, O O, and arms, C C, when all arranged and operated as and for the purpose described.

65,483.—ROTARY STEAM ENGINE.—J. E. Gillespie, Boston, Mass.

First, I claim the combination of the sliding and revolving radial wings or pistons and loose eccentric rings, E, for operation together essentially as specified.

Second, The loose eccentric rings, E, made adjustable from the exterior of the cylinder or case, substantially as herein set forth.

Third, The blocks, a, to the wings or pistons, F, made adjustable from the outside of the cylinder or case, essentially as described.

65,484.—CONSTRUCTION OF PIERS, DOCKS, AND WHARVES.—Richard A. Gilpin, Chester County, Pa.

I claim the construction, arrangement, and combination of the piles, a a, plates, b b, ties, d d, and walls, h h, in the manner and for the purpose herein described.

65,485.—SOAP FOR CLEANING AND POLISHING WOOD, METALS AND OTHER MATERIALS.—J. T. Greenwood and J. Wilson, Beloit, Wisconsin.

We claim a new article of manufacture—an improved soap for cleaning painted work and polishing metals, tin, gold, silver, and plated ware, composed of the ingredients herein stated in about the proportions specified for the purpose set forth.

65,486.—WINCH OR CAPSTAN.—John L. Heald, Boston, Mass.

First, I claim a roller, L, when employed in connection with the drum, C, of a winch or capstan, substantially as and for the purpose set forth.

Second, Supporting the shaft of the roller, L, in sliding bearings, h, operated by levers, K, or their equivalents, substantially in the manner and for the purpose described.

Third, The internal gearing, F, in combination with the pinion, E, on the crank shaft, D, for reducing the speed of the revolution of the drum, C, of the winch, as and for the purpose specified.

Fourth, In combination with the above, the gears, H I, for ensuring the simultaneous revolution of the shafts, B J, substantially as set forth.

65,487.—BOOT HEEL.—Louis Hoffman and Augustus A. Hoffman, Buffalo, N. Y.

We claim the connecting plate, C, constructed and applied as described, and provided with the spurs, f f, in combination with the screw, e, and reversible or removable outer portion, A, of a heel, arranged and operating substantially in the manner and for the purpose set forth.

65,488.—CHURNS.—James C. Jay and Joseph Younce, Wabash, Indiana.

First, We claim the devices for giving motion to the dasher in combination with the chair.

Second, Utilizing and applying the power of the rocking-chair in motion, and its easy and convenient motion for the purpose of churning.

65,489.—WRENCH.—Lucius Jordan, Southington, Connecticut.

I claim the arrangement of the bar, A, sleeves, D and E, nuts, F and H, and handle, G, the several parts being constructed and arranged in the manner and for the purpose herein specified.

65,490.—GAS CHAMBER AND VALVE FOR FORGES.—John V. Karr, Goshen, Ind.

I claim the box, A, made of any suitable shape and provided with an inlet and outlet pipe and air opening, E, when used with the valve, D, constructed and applied as and for the purpose specified.

65,491.—MACHINE FOR CUTTING THE LOCKS IN HOOPS FOR BARRELS.—F. C. La Riviere (assignor to Lucian D. Newall and Moses R. Greely), Minneapolis, Minnesota.

I claim the use of the lever, E, when constructed and operated to automatically clamp the hoop while the knife cuts the lock, in the manner and for the purposes substantially as set forth.

65,492.—SHOE.—Charles D. Letherburg, Chester, Pa.

I claim the within covering for the foot, consisting of the parts, B and C, and the flap, D, when cut of two pieces of material arranged as described.

65,493.—COOKING STOVES.—B. F. Livingston, Chicago, Ill.

I claim, First, The openings to the grate and the oven arranged in the top of the stove, substantially as and for the purpose set forth.

Second, The combination of the plates, C F, with standards, H, forming a double oven door, as and for the purpose set forth.

Third, The arrangement and combination of the ash pan, R, fire box, Q, and draft flue, P, with the door, O, substantially as described and set forth.

65,494.—COMPOSITION OR PASTE FOR ARTICLE OF FOOD.—Robert M. Livingston, Mobile, Ala.

I claim a cheese compound or paste substantially as above described.

65,495.—PADDLE WHEEL.—Elisha Matteson, South Brooklyn, N. Y.

I claim the use of two sets or series of paddles inclining inward, and arranged to gather and discharge the water, while they are made of gradually increasing and decreasing length to correspond with the increasing and decreasing power of the crank, substantially as herein specified.

65,496.—CHURNS.—William R. McCutcheon, Washington, D. C.

I claim, in churns where there are two shafts rotated in opposite directions, the wheel dasher having the inclined faces on the one shaft and below the perforated dasher, having its inclined faces on the other shaft, the two being operated as and for the purposes herein set forth.

5,497.—SPIKES.—George W. McGill, Washington, D. C.

I claim a split spike having one prong longer and larger than the other, and the smaller and shorter prong so bevelled at its point that one being driven into the wood it will diverge and spread from the main prong so as to operate as a brace and barb, substantially as and for the purpose described.

65,498.—ATTACHING THILLS TO CARRIAGES.—Charles D. Miller, (assignor to himself and C. H. Warner), West Meridan, Conn.

I claim, first, The combination and arrangement of the bar, b, extending between the heads, E, with the socket, C, and pivot, D, each constructed with a slot their entire length to receive the bar, b, and so as to operate substantially in the manner herein set forth.

Second, The arrangement of the groove, h, on the pivot, D, and the pin, c', in combination with the socket, C, substantially as and for the purpose specified.

65,499.—BAG FASTENERS.—James Miller, Ovid, Mich.

I claim the piece of sole leather or other substantial material, a, the leather strings or other strong cords, B and b b, and the iron hook, c, combined and arranged substantially as described.

65,500.—APPARATUS FOR CHARGING SODA FOUNTAINS.—Daniel Needham, (assignor to himself and Jesse A. Locke and C. M. Hovey, Groton, Mass.

I claim the tube, B, or its equivalent for containing one of the gas producing ingredients, operated in the manner substantially as described, in combination with the casing, A, of a fountain for soda and mineral waters, and other effervescing beverages, substantially as set forth.

65,501.—MACHINERY FOR FORMING MOLDS FOR STEREOTYPE OR ELECTROTYPE PLATES.—M. Nelson, New York City.

First, I claim communicating motion to the lever that impresses the types by an end motion of the pulley, 9, when the cylinder, c, is stopped, substantially as set forth.

Second, I claim the lever, h, incline, l, and sliding pulleys, 9, in combination with the key barrel, l, substantially as set forth.

Third, I claim the projection, 19, swinging frame, 20, with diagonal cam, 21, actuating the lever, p, in combination with the spacing block, q, the parts being arranged and acting substantially as set forth.

Fourth, I claim the auxiliary carriage, l', in combination with the beds, k and l, and levers, 31, and table, m, substantially as and for the purposes set forth.

Fifth, I claim the scale boards, 36, keys, 35, and levers, 31, in combination with the auxiliary carriage, l', as and for the purposes set forth.

65,502.—SKATE.—John W. Post, Castile, N. Y.

First, I claim the screw buttons, e' f' g', arranged substantially as and for the purposes described.

Second, The spring bar, i, provided with a lug, h, passing through a hole, c2, in the top part of the runner, B, substantially as and for the purposes described.

Third, The combination of the spring bar, i, provided with a lug, h, with the screw buttons, e' f' g', and plates, a' and d, provided with slots, a2 b1 and c1, substantially as and for the purpose described.

65,503.—BUTTON.—Joseph M. Prugger, New York City.

I claim a button having a shank whose base, a, is concave, in the center of which is secured at an obtuse angle the wire coil, c, whose convolutions are in the same plane with the base, whereby the button is uniformly supported while holding the cloth clamped in the concavity of the base, substantially as described.

65,504.—ICE CRUSHER.—Edward F. Pryor, Dayton, Ohio.

First, I claim the ice chamber, B, when provided with the chambered cover or extension, A, for containing the toothed plunger, D, and perforated diaphragm, F, either with or without the hinge, C, constructed substantially as described and set forth.

Second, The perforated diaphragm, F, or its equivalent, when arranged for use in an ice crusher, substantially as and for the purposes specified.

65,505.—WATER CLOSET.—Andrew Rankin, New York City.

I claim the pan or dish, D, and perforated receptacle, E, in combination with a water closet bowl, all arranged together and operating substantially as and for the purpose described.

65,506.—COG GEARING SPRING.—Jonah L. Rees, Peoria, Ill.

I claim the hub, D, with its arms, E, rubber spring, G, adjusting bolt, I, and tightening tap, L, of their equivalent, in connection with the arms, F, of bevel wheel, A, working in the manner and for the purpose specified.

65,507.—PETROLEUM VAPOR STOVE.—J. J. Riddle and W. S. Gray, Pittsburgh, Pa.

First, We claim a coiled, curved, or other ordinary shaped continuous conduit heater, P, within the flame and of sufficient length to vaporize any of the different grades of petroleum oils in combination with foraminous cap, E, and mixing chamber, H, for the uses and purposes mentioned substantially as described.

Second, We claim the carrying of water from a vessel, R, into the flame, in chamber, F, by means of tube, W, filled with any ordinary capillary substance, W, for the uses and purposes mentioned substantially as described.

Third, We claim the carrying of steam from a closed vessel, C, by means of tube, S, into the flame in chamber, F, for the uses and purposes mentioned substantially as described.

Fourth, We claim the carrying of water into the cold oil from a vessel, B, by means of the capillary substance, d, and tube, h, for the uses and purposes mentioned substantially as described.

65,508.—SASH FASTENER.—Amos C. Rodgers, Philadelphia, Pa.

I claim a sliding frame or door, B, with its plate, b, at the edge in combination with a plate, F, and with screw, D, whereby the plate, F, may be brought firmly against or removed from contact with the plate, b, the whole being constructed and operating substantially as and for the purpose described.

65,509.—BREECH-LOADING FIRE-ARM.—Matilda C. Root and Elisha Colt, Hartford, Conn., and Harris Colt, New York City, executors of E. K. Root, deceased.

First, We claim the employment in construction with the open breech barrel and frame of a sliding breech piece, constructed and arranged to operate in the manner substantially as set forth.

Second, We also claim the extractor shoe or piece in combination with the sliding breech piece and the frame in which both said parts work, arranged and operating substantially as set forth.

Third, We also claim the double-acting spring, S, in combination with the seer, R, and catch bar, T, the whole constructed to operate substantially as set forth.

Fourth, We also claim the hammer, M, constructed as described in combination with the sliding rod or bar, w, and check pin, n, substantially as described for the purpose set forth.

65,510.—REVOLVING FIRE-ARM.—Matilda C. Root and Elisha Colt, Hartford, Conn., and Harris Colt, New York City, executors of E. K. Root, deceased, assignors to Colt's Patent Fire-arm Company, Hartford, Conn.

First, We claim the employment in combination with a removable breech block or cylinder of a vibratory base pin, substantially as and for the purpose set forth.

Second, The employment in combination with a rotatory base pin of a cylinder bored through when the whole is so constructed and arranged that the cylinder may be placed in the said base pin and engage therewith with either end forward, as and for the purpose set forth.

Third, The employment in connection with the stock barrel and a swinging cylinder of a frame, A', of the shape substantially as described so as to permit the removal and replacement of the cylinder, in the manner set forth.

65,511.—STEAM GAGE COCK.—James Sanders, East Boston, Mass., assignor to himself and Noah H. Marston, Boston, Mass.

I claim the hollow conical plug, B, with its spindle, C, end opening, d, in combination with the shell or casing, A, the interior of which is of a tapering form, all arranged and operating substantially as and for the purpose set forth.

65,512.—COMPOSITION FOR CONVERTING IRON INTO STEEL.—Thomas Sheehan, Dunkirk, N. Y.

I claim the saturation of the liquid combination described in my former patent with carbonic acid gas, substantially for the purpose set forth.

65,513.—CAR COUPLING.—G. W. Shingleton, Auburn, N. Y.

First, I claim the levers, k k, in combination with the treadle, B, operating substantially as and for the purpose set forth.

Second, The springs, n n, when operated upon by levers, k k, as and for the purpose specified.

Third, The pivoted connecting pin when constructed and used substantially as and for the purpose described.

65,514.—LIFTING JACK.—Tilman Shiver, Newburgh, Ind.

I claim the construction and arrangement of the laterally vibrating bar, C, pivoted at its lower end to the part, B, and at its upper end to the lever, G, which is pivoted to the part, A, of the jack, the said parts, A and B, being recessed as at e d, substantially as and for the purpose described.

65,515.—FILTER FOR PHARMACEUTISTS AND OTHERS.—A. B. Spencer, Rochester, N. Y.

First, I claim in an atmospheric filter composed of the tunnel, A, bottle or jar, B, and air pump, C, the employment of a packing, h, for the purpose of producing an air tight joint between the tunnel and bottle, the whole combined and operating as herein set forth.

Second, The arrangement of the filtering medium, d d, with the removable perforated diaphragm, f, when operating in connection with the shoulders, c c, as herein set forth.

65,516.—FURNACE FOR HEATING ARTICLES OF STEEL IN THE PROCESS OF TEMPERING.—Benjamin S. Stokes, Manchester, N. H.

I claim the cellular muffle, K, substantially as and for the purpose set forth.

I also claim placing the flue, C, at or near the front of the furnace for the purpose described.

I also claim forming an air space, g, within the door, F, substantially as and for the purpose set forth.

I also claim the cellular muffle, K, in combination with a furnace provided with a flue, C, and a double door, F, constructed and operating substantially as described.

67,517.—SAWING MACHINE.—J. B. Sweetland, Pontiac, Mich.

I claim the arrangement of lever, P, with the cord, S, box, d, and pin, q, and shaft, M, for raising the saw and throwing the roller in gear to move the timber at the same operation, substantially as set forth.

65,518.—RAILWAY SWITCH AND SIGNAL.—George L. Warner (assignor to himself and Cornelia Hawks), Rochester, N. Y.

I claim the combination and arrangement with the switch, B C, of the elevated and isolated signal, L, connected by the cord, c, and provided with counterbalance weight, f, operating in the manner and for the purpose specified.

I also claim specially beating the cam shaft, G, in the ends of the shifting rails and providing it with cams that couple the ends of the rails directly together, as herein set forth.

I also claim the arrangement as a whole consisting of the weighted signal, L, cord, c, switch, B C, cam shaft and cams, G a a, and the standard frame, I K, with guide, b, and screen, g, as set forth.

65,519.—FARM GATE.—James B. Webb, Muscatine, Iowa.

I claim the combination of the gate, A, post, B, adjustable head piece, C, with the rods and levers, D E F and F' and double crank rods, G and G' arranged to operate substantially in the manner and for the purpose set forth.

65,520.—FOLDING CHAIR.—George E. Whitmore, Housatonic, Mass.

I claim the combination of the arm posts, B, straps, D, and headers, A, with their stop pins and slots, G, constructed and arranged in a folding chair in the manner and for the purpose set forth.

65,521.—HUB FOR WHEELS.—G. E. Whitmore, Housatomic, Mass.

I claim the combination by which the the wooden parts of the hub is encased and supported at both ends and on its periphery by the iron flanges enabling the wheel makers to drive the spoke firmly into the smallest hub and thus attaining the desired qualifications of elasticity and strength.

65,522.—BEEHIVE.—A. T. Wright, New Vienna, Ohio.

First, I claim the honey frames, R, and broad frames, R', as constructed when used in the manner herein specified, with the triangular strips, a3, for closing the openings between the frame sections, F F', as set forth.

Second, The combination and arrangement of the bars, G, pieces, K, and eccentrically tenoned locks, L, with the frame sections and connecting boards, N, as constructed, when used for the purposes set forth.

Third, The frame sections, A, having a concavity, a a', at its top, slanting board, b2, and receptacle for feed box, D, ventilating screens, b and c, with door, b, and adjustable bottom, c1 c2, when constructed and arranged in the manner and for the purposes specified.

Fourth, Providing the under part of the beehive stand with rubber bands, x, or their equivalents, in the manner substantially as specified and for the purposes set forth.

Fifth, The feed box, H, constructed as herein specified, having a lid with screen, w, and cleats on its under side for allowing a space between the said lid and the box for the egress and ingress of the bees, as specified.

65,523.—BOLT CUTTER.—Wm. W. Wright and John Boody, Ellsworth, N. Y.

We claim the combination and arrangement of the bars, A and B, lever, E, plates, C and D, and spring, F, constructed and operating in the manner and for the purpose specified.

65,524.—HEATING STOVE.—Thomas Yates, Dubuque, Iowa.

First, I claim the arrangement of the open-top fire-chamber, A, in combination with the upper draft-chamber, f f, so that the draft can be directed around the open-top fire-chamber, A, as specified.

Second, The arrangement of the two dampers, g and h, in the upper draft-chamber, f f, so that the draft can be changed in the different directions, as specified.

RE-ISSUES.

2,633.—METHOD OF PRODUCING MOSAIC VENEERS.—Otto Heinigke and Moritz Laemmel, Bay Ridge, N. Y. Patented May 29, 1860.

First, We claim the within-described method of producing mosaic veneers from strips of any desired cross section and of various colors, said strips being formed by pressing a suitable plastic material, which will harden after having gone through the whole process, through openings of the required shape, substantially as and for the purpose described.

Second, Uniting the strips formed as above described into blocks, G, a cross section of which represents the pattern to be represented by the mosaic veneer or a portion of the same, substantially in the manner and for the purpose specified.

2,634.—SKIRT.—J. E. Lucas, J. P. Arey and Charles G. Howard, Springfield, Mass., assignees by mesne assignments of William Heppenstall. Patented Oct. 30, 1860.

We claim a woven skirt having hoops or wires inserted into woven pockets and having woven into the weft, draw strings or threads composed of larger or stouter warp yarn than that of which the web generally is formed, substantially as specified.

2,635.—HORSE-POWER.—Stuart and Adeline Perry, Newport, N. Y., assignee by mesne assignments of Stuart Perry. Patented July 21, 1863.

We claim the combination of an endless chain with a pulley driven by it and so made that while a bed or bearing furnished with projecting teeth or ribs receives one class of links in such a way as to prevent their slipping, a recessed portion of said pulley shall receive the other or connecting links that hold relatively opposite positions with regard to the other class, substantially as described.

We also claim, in combination with an endless chain and a pulley driven by it, the steel or chilled teeth or ribs on said pulley, substantially as and for the purpose described.

We also claim the combination of an endless chain and a pulley driven by it when said pulley is furnished with pieces inserted and movable for the purpose of preventing the chain from slipping and to make better adjustments and thus increase the durability of the chain and other parts working with it, substantially as described.

We also claim, in combination with an endless chain and a pulley driven by it, said pulley being furnished with teeth, ribs or recesses to prevent the chain from slipping, a device that is moved or governed in such a way when the power is operated that it takes up the slack of the chain and makes a more uniform tension, substantially as described.

We also claim, in combination with an endless chain and with a ribbed, toothed or recessed pulley driven by it, guide pieces to guide the chain as it passes from the driving wheel accurately into or upon said pulley, substantially as described.

We also claim, in combination with an endless chain and a pulley driven by it, a wheel or wheels so placed as to hold the links of the chain in the recesses or between the ribs or teeth of said pulley, substantially as described.

We also claim the combination of an endless chain with one or more pieces or pulleys so constructed with a narrow groove as to admit the projecting parts of the alternate links of a coil chain while the connecting links rest upon the periphery each side of the narrow groove to prevent the twisting of the chain, substantially as described.

We also claim, in combination with a sprocket or main wheel and chain, a screw buckle, or its equivalent, for taking up and keeping the outer ends of the arms in firmer position, tightening up points and for keeping all the parts "taut," as also for loosening up the parts when said wheel is to be taken down for transportation, substantially as described.

We also claim, in combination with an endless chain and a ribbed or notched pulley driven by it, the metallic forks to receive and carry said chain, and an apparatus to take up the slack of the chain, and guide the chain to the pulley, substantially as described.

We also claim the combined use of the upper and under metallic arm holders having suitable provision to receive the inner ends of the arms, and the upper holder pivoted on the top of the center post of the large drive wheel, substantially as and for the purpose described.

We also claim arranging the arms of the drive wheel in pairs vertically one over the other for giving great stability to the wheel, substantially as described.

We also claim, in combination with an endless chain and a drive wheel, the use of sockets to hold the outer and inner ends of the arms of said drive wheel, substantially as described.

We also claim the use of sockets to hold the outer ends of the drive wheel arms to facilitate the setting up and taking down of said wheel as well as to strengthen it when up, substantially as described.

We also claim the use of iron tie rods at or near the extremities of the arms of the large driving wheel for tying said arms in combination with an endless chain, substantially as described.

We also claim constructing the large drive wheel with sockets and tie rods and a screw buckle in such manner as wholly or partially to dispense with the use of bolts and nuts or keys, and thus facilitating the setting up and taking down of the wheel when used in the field or when it is to be transported, substantially as described.

We also claim, in combination with an endless chain and a recessed and ribbed pulley driven by it, one or more metallic arm holders for holding the inner ends of the arms of the drive wheel on which the chain works, substantially as described.

We also claim, in combination with an endless chain and a sprocket or drive wheel and a recessed or toothed pulley driven by said chain, a piece or part that moves while the power is working to take up the slack, and a series of arms in pairs for giving greater stability to the wheel and more facilities in use, substantially as described.

We also claim, in combination with a sprocket wheel and a driven wheel, pulley or drum, a case hardened steel or cemented chain for the purpose of preventing its being unduly cut or worn away and thus increasing its durability, substantially as described.

We also claim, in combination with an endless chain and a pulley driven by it, a wheel pulley or deflecting device for changing the directions of the chain as it passes from the main wheel to the power transmitting pulley for the purpose of causing the chain to further encircle the driven pulley by giving it more "bite" or contact therewith, substantially as described.

2,636.—PRIMING METALLIC CARTRIDGE.—Horace Smith and Daniel B. Wesson, Springfield, Mass. Patented April 17, 1860.

We claim a primed cartridge case composed of two parts, viz: 1st, a flanged case or shell of one piece of metal and of sufficient length to hold the fulminate, the propelling charge and the projectile, and 2d, the fulminate arranged substantially in a ring form at the base of said shell in contradistinction to being distributed equally or thereabouts over the entire base, the said two parts being combined and arranged substantially as before set forth.

We also claim a complete cartridge composed of the following parts; viz: 1st, a flanged case or shell of one piece of metal and of sufficient length to hold the fulminate, the propelling charge and the projectile, 2d, the fulminate arranged substantially in a ring form at the base of said shell as aforesaid, 3d, the propelling charge; 4th the projectile, these four parts being arranged and combined substantially as before set forth.

2,637.—APPARATUS FOR GRAINING PAILS.—John R. and

Alfred J. Cross, Chicago, Ill. Patented December 27, 1864.

First, We claim an elastic bed of any suitable material whether curved or rectangular in form, when arranged in a series of distinct staves or designs, substantially as and for the purposes specified.

Second, We claim constructing the said bed of elastic material in the curved form shown, to be applied as described whether said bed be arranged in a series of distinct designs or in one general design, for the purposes set forth.

2,638.—FENCE.—Theodore E. King, Painesville, Ohio. Patented June 26, 1866.

First, I claim the plate, C, when used in co-relation to the picket and rail either in a series or singly with its intaglio surface corresponding to the conformation of the said picket or rail, substantially as and for the purpose set forth.

Second, I claim strengthening the fence panels and uniting the pickets and rails thereof by means of plates or sets of plates figs. 3 and 5, and so arranged at right angles to the picket and rail, and in combination therewith that the said plates s all form a series of supports to the panel sections, substantially as specified.

Third, I claim the plate fig. 3 or its equivalent when so arranged in relation to the rail that the said plate shall form an extension of the picket above, and constitute a brace or support for the fence panel in conjunction with the picket and rail, substantially as set forth.

Fourth, I claim the adjustable hinges constructed with the depressions, a a s, and slots, U U, substantially as shown in figs. 10 and 11, in combination with the tooth, b, and screw holes, c c, of the lower plating of the gate as herein described and for the purpose specified.

Fifth, I claim the adjustable catch as shown in figs. 14 and 15, provided with the screw bolt, W, and stud, X, in combination with the opening Y, of the post and constructed and arranged as and for the purpose set forth.

2,639.—MOWING MACHINE.—Charles C. More, Pittstown, N. Y., assignee by mesne assignments of E. F. and J. Herrington. Patented April 9, 1861.

First, I claim a shoe brace which is rigidly attached to the finger bar and which extends backward between the drive wheels on a line parallel or nearly parallel with the side of the main frame and is hinged at its rear end to said frame.

Second, Connecting the finger bar to the shoe brace which is hinged at its rear end to the main frame in such manner as to allow said finger bar to rise and fall at each end independently of the other to conform to the surface of the ground over which it is drawn.

Third, The lateral brace rod in combination with the shoe brace, substantially as and for the purpose set forth.

Fourth, The combination in a forward cut machine of a hinged cutting apparatus with the main frame in such manner that both ends of said cutting apparatus, each end independently of the other, may be raised by the attendant on the machine, by the operation of a single lever.

Fifth The combination of a lifting mechanism with the hinged cutting apparatus in such manner that said cutting apparatus may be raised or turned up into a verdical or nearly vertical position for passing obstruction by the operation of a single lever by the driver on his seat on the machine.

Sixth, A lifting lever provided with an internal segment rack for the purpose specified.

Seventh, A lifting lever provided with a segment rack in combination with a foot latch for holding said lever as described.

Eighth, The combination of a lifting lever with a hinged cutting apparatus which can be turned up by the side of the machine, and a foot latch for holding said lever when the cutting apparatus is raised.

Ninth, The foot rack or bar or its equivalent operating upon the heel end of the cutting apparatus to hold said end while the point of the cutting apparatus is being turned up as set forth.

Tenth, The combination of the foot rack and the segment lever or their equivalent for the purpose specified.

Eleventh, The employment of a spring for holding the foot rack out of gear or lock, when not in use, to allow the cutting apparatus to follow the surface of the ground over which it is drawn.

Twelfth, The arrangement of pinions on the opposite ends of the counter shaft, in combination with a mechanism for simultaneously throwing said pinion into or out of gear.

Thirteenth, The employment of the pivoted levers, d3 d3, forked at one end and operating in the manner and for the purpose specified.

Fourteenth, The employment of the wedge, d5, for the purpose specified.

Fifteenth, The double horizontal hinged connection between the heel of the cutter bar and connecting rod.

Sixteenth, The reversible wedge or its equivalent for changing the angle of presentation of the cutters to the ground.

Seventeenth, The combination in a harvesting machine of the following elements viz.: a main frame, an independent seat and tongue frame and a hinged cutting apparatus which is free at each end independently of the other end and of the main frame, to follow the surface of the ground over which it is drawn.

2,640.—GRAIN DRILL.—Worden P. Penn, Jacob Geiss, and Jacob Brosius, Belleville, Ill. Patented June 27. 1865. Antedated Dec. 27, 1864.

First, We claim bracing the drill toothed to its drag bar by means of a separate brace in such a manner as to allow it to fold forward without breaking the wood pin, substantially as set forth.

Second, The arrangement of slides, C, fixed plates, d, with check pieces, o2, and movable plates, d1 d2, in combination with the hopper, all constructed, arranged and operating in the manner and for the purposes specified.

Third, The construction of agitating slide with double beveled projections, e' e' and e easing pins, e2, in combination with the divisions, a a, vibrating hangers, D3, and seed distributing devices shown, substantially as and for the purposes specified.

Fourth, The long cut off plate, d, arranged with the plates, d d' and slide, C, and connected with the drill teeth by means of the pivoted vibrating bar, E, and chains, g, and operated by a handle, E' all in the manner and for the purposes specified.

Fifth, The pendent stand board, J, arranged substantially as described, upon a seed drill for the purposes set forth.

2,578.—SEWING MACHINES.—Alfred B. Ely, assignee of Reuben W. Drew, Newton, Mass. Patented Nov. 5, 1861. (Div. A).

1st, I claim rotating and operating positively the thread-guide within a supporting horn for entering the work so that the thread shall be laid in the path of the hook of the needle, whatever the form, direction, or length of seam, by means substantially as described.

2d, Rotating and operating the thread guide or whir, by means of a geared rod, constructed and operating substantially as and for the purposes described.

3d, The combination of sliding cam, L, rack bar, N, rod, O, and whir or their equivalents, substantially as and for the purposes described.

4th, So constructing and arranging the guide in relation to its actuating devices that it may be rotated and operated by a geared rod, substantially as described.

5th, The combination of a horn for entering and supporting the work with a rotating geared rod for operating the whir, and a whir for presenting the loop to the barb of the needle, substantially as described.

2,579.—SEWING MACHINES.—Alfred B. Ely, (assignee of Reuben W. Drew), Newton, Mass. Patented Nov. 5, 1861. (Div. B).

1st, I claim so constructing and so arranging the parts of a sewing machine in combination with a main operating shaft, that the needle bar when positively or directly attached or coupled to its actuating arm can be revolved positively and freely above the work, and to any desired extent in the direction at the will of the operator as the stitching progresses, and be made to operate for any length of time at any position of its revolution by means substantially as described.

2d, So constructing and arranging the needle bar and the feeding point that they can be revolved either way together and preserve their relative positions.

3d, So constructing and combining the rotating needle bar with the feeding point that the feed shall form a guiding point to the needle and space the stitches.

4th, The combination of the spring cast-off needle and feeding point when constructed and arranged substantially as described.

5th, The adjustable eccentric with its connections or their equivalent for altering and adjusting the throw of the needle bar.

6th, The mechanism substantially as described for revolving the needle, or it and the parts connected therewith, or presenting them properly to the work by hand that the seam may be laid in any direction as the sewing progresses.

7th, Revolving the needle bar automatically by means substantially as described

2,580.—SEWING MACHINES.—Alfred B. Ely, (assignee of Reuben W. Drew), Newton, Mass. Patented November 5, 1861. (Div. C).

1st, I claim so constructing and so arranging the parts of a sewing machine in combination with a main driving shaft, and so combining the operations of the needle and thread guide, actuated substantially as described, that any change of position of the needle to the work shall be accompanied by a corresponding change of position of the thread guide in sewing either way and to any desired extent in either direction, substantially as set forth.

2d, In combination with a work-supporting horn, substantially as described, I claim so constructed and arranging the parts of a sole sewing-machine that while in the sewing of curves and angles the barb of the needle shall be made to enter and pierce the work across the line of seam, the whir shall be revolved and operated so as to lay the thread across the needle barb along the line of seam, substantially as set forth.

Third, The combination of cam cylinders, S and L, or their equivalents with their connections, substantially as and for the purposes described.

Fourth, The sliding cam, L, for changing the position of the whir operating mechanism, substantially as described.

Fifth, The combination of a hook needle for seizing the loop, with a horn for entering and supporting the work, a geared rod for operating the whir, and a whir for presenting the loop to the needle, substantially as described.

Sixth, The combination of hooked needle cast-off for shedding the loop, and feeding device for feeding the work with the horn geared rod and whir, substantially as described.

DESIGNS.

2,661.—CENTER PIECE.—Henry Berger, New York City.

2,662.—COOK'S STOVE.—A. E. Chamberlain and John B Crowley, (assignors to Chamberlain & Co.), Cincinnati Ohio.

2,663.—TRADE MARK.—Giles F. Filley, St. Louis, Mo.

2,664.—SPOON OR FORK HANDLE.—Alonzo Hebbard, New York City.

2,665.—PENDING WHEEL.—Charles Kirchhof, Newark, N. J.

2,666 and 2,667.—TRADE MARK.—Samuel McCartney, St. Louis, Mo. (Two patents).

2,668 and 2,669.—BURIAL CASE.—Bernard Smith, (assignor to American Burial Case Company), Cincinnati, Ohio. (Two Patents).

2,670.—TRADE MARK.—Henry Tetlow, Philadelphia, Penn.

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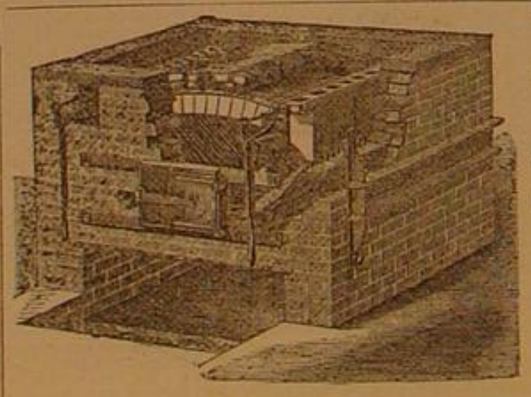
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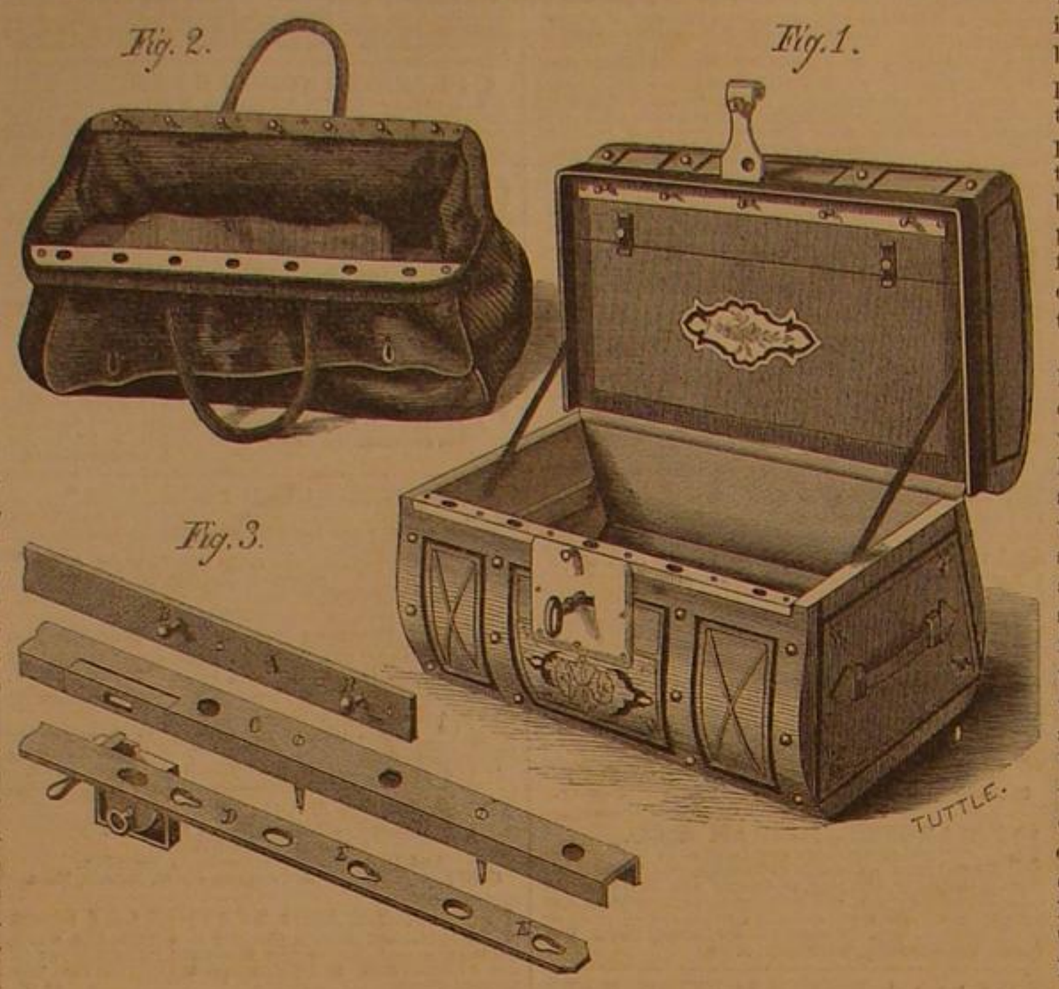
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The action is very simple. As seen in Fig. 1 a small knob attached to the sliding plate projects through the front of the trunk, by which when the pegs, B, have passed through the sliding plate it can be shifted so that the small ends of the pear-shaped holes embrace the shanks of the pegs and hold the lid firmly. The turning of the key locks this sliding plate as well as the hasp of the lock, and when the trunk is locked the knob by which the plate is moved is covered by the hasp. Thus the plate is held in place when locked so that no portion of it can be disengaged from the pegs until the key is turned and the knob uncovered. The apparatus can be so modified that the turning of the key alone will make the connection between the lid and trunk without the employment of a projecting knob.

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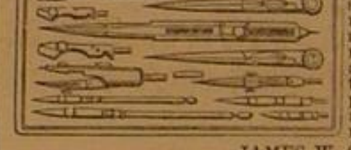
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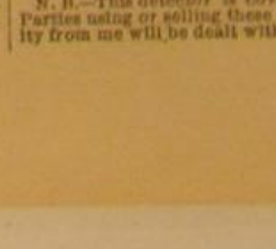
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SCIENTIFIC AMERICAN

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

Vol. XVI.—No. 26. [NEW SERIES.]

NEW YORK, JUNE 29, 1867.

$3 per Annum [IN ADVANCE.]

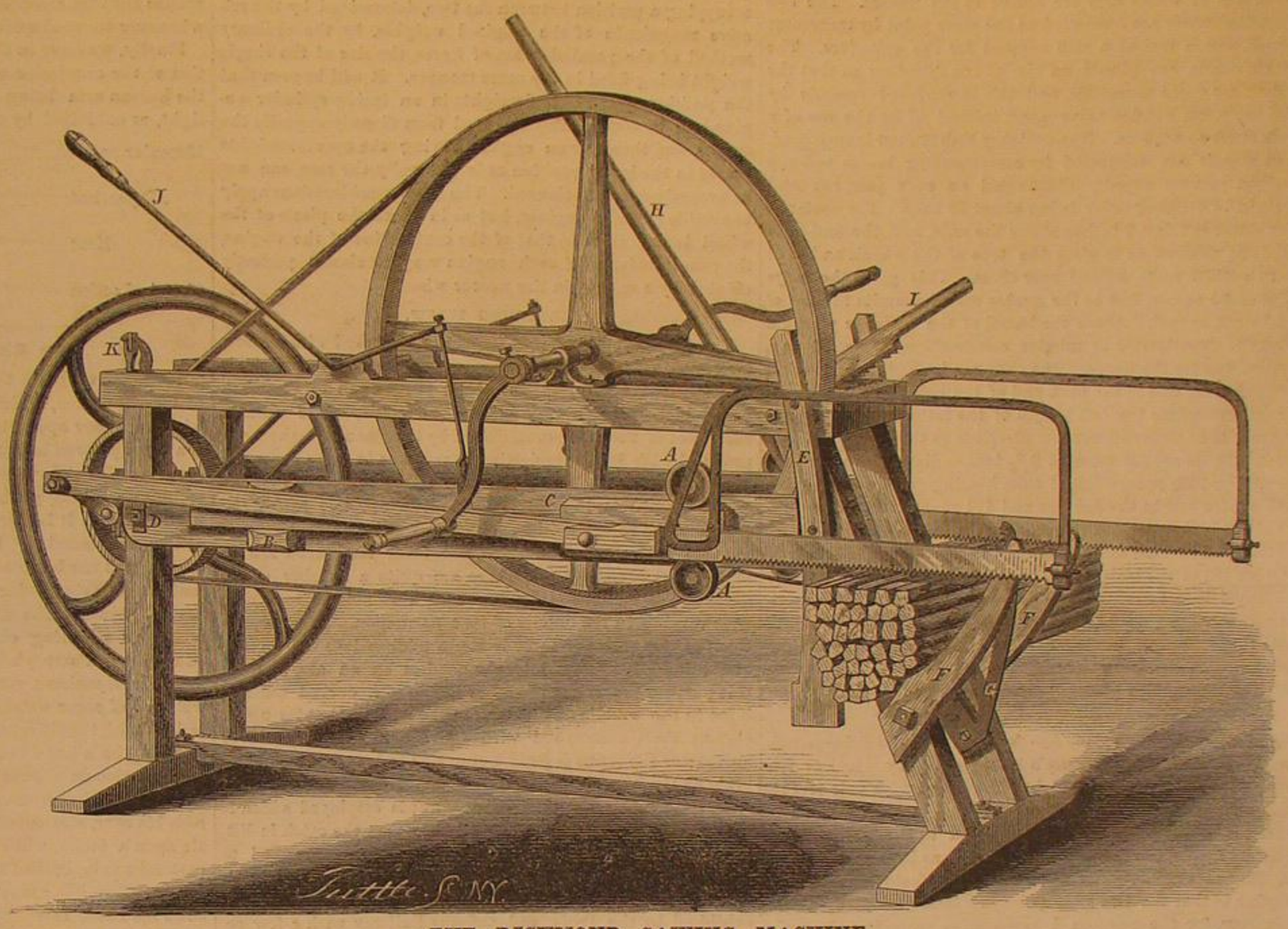
Improvement in Sawing Wood.

The buck and saw are undoubtedly useful implements for preparing fuel from wood, but it may be questioned whether they are favorite instruments for the development of muscle, even for those who are devoted to gymnastic exercises.

The machine represented in the annexed engraving is intended to take the place of the ordinary buck saw, and may be operated either by hand or by steam or horse power, one or both saws being run. Its general construction is easily understood, the machine being a frame mounting a driving wheel with cranks, a balance wheel, and the saws with the necessary connections. The power is applied to the center band wheel, which, by means of a belt, drives the crank shaft, with pulley and fly wheel, at one end of the frame. From the cranks on each end of this shaft connecting rods are attached to bars, the forward ends of which traverse between upper and under rollers, seen at A, and the other ends between guides, B. These sliding bars, with the rollers, guides, and the saws are all attached to the side pieces, C, which are pivoted at D, near the crank shaft, and the other ends of which can be raised or lowered, directed by the curved guides, E, which are bolted to the frame of the machine. This arrangement allows the saws to pass down through the log or bundle of sticks as they progress, while the relative positions of cranks, connections, and slides are unaltered.

The rear end of the frame is inclined from the top outward and furnished with two braces, F, inclined in the opposite direction to form a receptacle for the wood to be sawed. The inclined supports of the frame are furnished with spurs to secure the wood, and the log or pile is held securely by the jack, G, having teeth on its inner edge and operated by the lever, H, and the hold-fast, I. When the receptacle is to be loaded the saws with their appurtenances are raised by depressing the handle, J, which may be locked in position by the swing catch, K. The wood, being placed in position, is confined securely by the lever, H, and the jack, G, when the handle, J, is released, allowing the saw to come in contact with the wood. Nothing more is necessary then than to give motion to the saws by the crank handles, while the weight of the pivoted side piece, C, with its appurtenances, carries the saws through, its progress being stopped, when the saw has passed through, by the block on the bottom of the segmental guide, E. One side of the machine is a counterpart of the other, and one or both saws may be used at the same time.

It is claimed that this machine, although light, portable, and cheap, will, by the power of one man do four times the work in wood sawing in a given time than can be done by the buck and saw. It is especially suited to householders, farmers, and persons engaged in furnishing wood fuel for the market, as it may be used at the house, shop, or in the woods. It is the subject of a patent granted to F. J. Richmond through the Scientific American Patent Agency in 1864. Rights and machines for sale at the office and manufactory Nos. 56, 58, 60 and 62 West 13th street, New York. All communications addressed to Phyfe, Richmond & Co., as above, will receive attention.



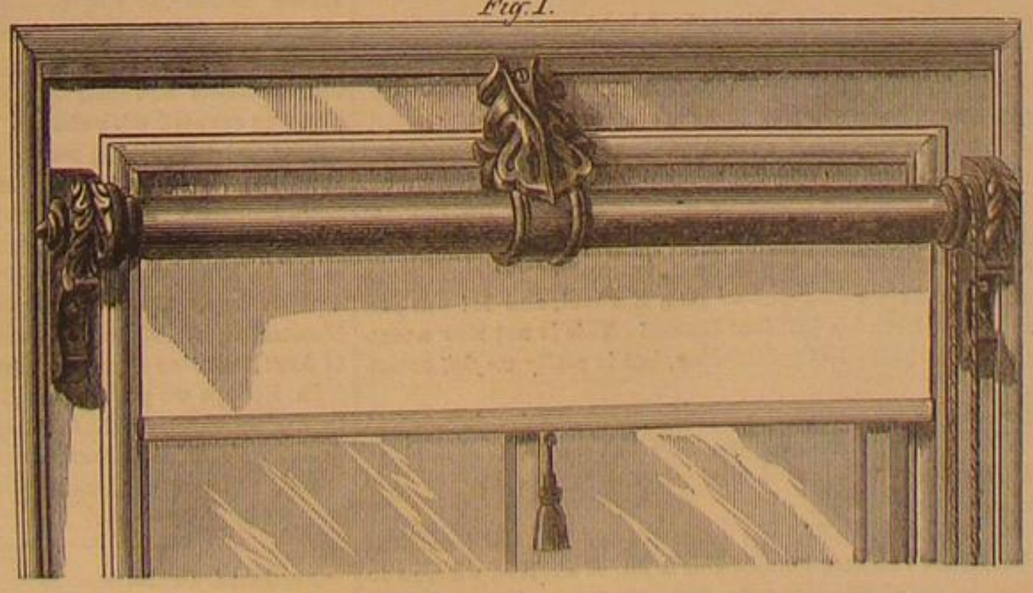
THE RICHMOND SAWING MACHINE.

TRIAL TRIP OF THE BRISTOL.—This immense steamer which with her consort, the *Providence*, is intended for the new line between New York and Boston, made a trial trip on the 11th of June, carrying over twelve hundred guests. The hull was built by Wm. H. Webb, and the machinery and boilers by John Roach & Son, Ætna Iron Works, from designs by Erastus W. Smith, A. P. D. The vessel has a capacity of 3,000 tuns and the cylinder of the engine measures 110 inches. She is the largest steamer ever built for the Sound traffic. In our next we shall give a description of the vessel and her machinery.

Improvement in Attaching Window Shades.

As the inventor truly remarks, the exhibition of a bare roller of a curtain or shade detracts from the completeness of a sitting room or parlor, and there is no adequate reason why elegance cannot be combined with usefulness without drawing too heavily on purses already tested to their full extent. The device herewith illustrated appears to combine elegance with usefulness and convenience without heavy cost. It is easily described.

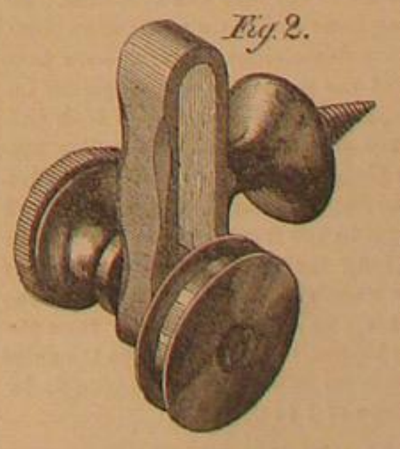
Fig. 1.



BROWN'S IMPROVED SHADE FIXTURES.

Fig. 1 shows the upper portion of a window with the fixtures and shades. The roller to which the shade is attached is concealed by a sheath, and differs from the ordinary roller only in being in two pieces, really a roller split longitudinally for the reception of the cloth of which the shade is composed. One of these longitudinal sections has a central recess running its whole length, into which fits a corresponding splinen or feather on the other half. This arrangement tends to hold the shade fast without tacking or other security. The ends of the split roller are secured by a button or disk, either screwed on or held in place by friction, both of the disks having studs which fit into the end brackets, forming axes for the roller, and one of them being a grooved pulley for the cord One of the supporting end brackets holds a spiral spring the tension of which retains the shade at any hight. The whole roller is covered with a double sheath of ornamental wood or metal, slotted to allow the fabric of the shade to pass through, and the ends at the center of the roller are supported by an ornamental suspended bracket enveloping the sheath, which is slotted on the under side to correspond with the slots in the sheath itself. All the exposed parts of this fixture are ornamented by carving if of wood, or by graceful designs if cast or stamped of metal. Fig. 2 is the lower cord pulley with its appurtenances. It has a tapering screw by which it may be seated at a convenient point in the window casing, and the pulley may be elevated or depressed in the slotted portion and held by the thumb nut.

Fig. 2.



The whole makes an elegant and sightly contrivance for the sitting room or parlor, and the sheath, when the shade is wound up, preserves it from sun and dust. Its cost is not great, slightly above the common plain fixtures, while it pleases the eye and yet performs its office. Patent pending on this device through the Scientific American Patent Agency, by Wm. Brown, West Cambridge, Mass., who will furnish any further information desired.

THE LIVINGSTONE SEARCH BOAT.—An exploring expedition is about to be dispatched by the British Government under command of Mr. Young of the royal yacht, and a portable sectional iron boat is building from designs by Chief Constructor Reed, of the navy. The sections will be two feet in length and not over 40 pounds weight, to be carried overland between the navigable lakes and water courses. The plates are one-sixteenth of an inch thick. The disputed question of Dr. Divingstone fate will at least be cleared up.

Special correspondence of the Scientific American.

LOCOMOTIVES IN THE EXPOSITION.

PARIS, May 16, 1867.

FOUR CYLINDER LOCOMOTIVE.

One of the most remarkable locomotives in the Exhibition is a twelve wheel coupled tank engine by Messrs. E. Gouin & Co. constructed for the Chemin de Fer du Nord. There are four cylinders of 17½ inches diameter 17½ inches stroke, two at the forward and two at the back end of the engine each driving three pairs of wheels, the connecting rods taking hold of the middle pair. The diameter of the wheels is 3 feet 6 inches and the length of the wheel base is 19 feet 9 inches. To facilitate the passage of the engine around curves, two thirds of an inch end play is allowed in the bearings of the extreme axles and the coupling rods are provided with a joint near the central crank pin admitting of a slight horizontal movement of the extreme axle instead of one adapted to vertical motion, as usually employed. Thecylinders, which are horizontal, are placed outside and have large flanges cast on them by means of which they are bolted to the frames. The two opposite frames are connected at the same point by transverse plates, which makes a stiff support for the cylinders. The steam chests are placed on top of the cylinders so that the valves are quite accessible, and this is rendered possible by the use of an outside valve gear, instead of by the use of a rock shaft-as with us. The ordinary link motion is employed. The wheels are connected by compensating levers and the weight is very equally distributed on each pair, the total weight in working order being about 59 tuns. The center of the boiler is 7 feet 2 inches above the rails, and the firebox is made so shallow as to clear the tops of the wheels and is of such a width as to extend over them. This gives the large area of 33 square feet to the grates which permits the use of coal slack as fuel. Above the barrel of the boiler is placed a dryer or superheater of tubular construction, arranged as a return flue for the gases. The chimney is carried horizontally back from this to the back end of the boiler (the superheater not extending the full length of the latter) and then turns up just so as to give a vertical direction to the smoke and cinders. There are 275 tubes of $2\frac{3}{8}$ inches diameter in the boiler giving 1200 square feet of tube heating surface which with 107 square feet in the fire box and 414 square feet in the dryer and a feed water heater gives 1721 square feet for the total surface The base of the chimney being near the center of the length of the boiler the exhaust steam has a long distance to travel before reaching the blast pipe. There are a number of these engines at work on the Chemin de Fer du Nord, and they of course haul very heavy trains, but I believe they are not very steady on the rails and it is doubtful if any more will be built. The pressure of steam used is 118 lbs.

ANOTHER REMARKABLE ENGINE.

Standing close by this is one for the Paris and Orleans railway, built at the company's shops at Ivory It has ten coupled wheels of 3 feet 6 inches diameter, and a pair of outside cylinders of about 19½ diameter by 24 inches stroke. The surface by which the cylinder is bolted to the frame plates appears ample, the latter being stiffened as in the previously mentioned engine. The most noticeable feature about this engine is that the two after axles are furnished with outside bearings, for the purpose I presume, of removing the axle boxes further from the fire box, and as the bearings are maintained of an ample width on these as on the other axles, and as of course an outside crank must be employed to receive the coupling rods, an extremely long crank pin is required in the driving wheel which is the center one of the five. This pin has three journals, the outer one of course being used for the coupling rod for the after pair of wheels with outside bearings, and the inner one is used for the coupling rod for the forward pair, the connecting rod taking hold of the middle bearing. Of course the strain of the after pair of wheels applied at such a distance from the wheel must be very severe on the crank pin. Still outside of this is an overhung crank for the eccentrics of the link motion, which is of the stationary link kind. The boiler is flush for its entire length and is covered entirely with sheet brass as are also the cylinders. Instead however, of this being done with taste as in our engines, it is full of corners and sharp depressions, as usual over here to adapt itself to the form of the casting, the consequence being that it can never be kept clean and will always look badly on that account. The use of the outside link motion enables the steam chest to be placed above the cylinder, the latter being horizontal and the former inclin d. The piston rods work through stuffing boxes in the front head to sustain the weight of the pistons. A long tank extends on each side of the engine just over the wheels from the cylinders to the back of the foot plate except at a short distance from the front where a continuity is broken to allow access to the axles boxes of the forward wheels for oiling. This engine is intended for working an incline of 1 in 29.

ADJUSTMENT OF COUNTERWEIGHTS.

An engine with a steam tender, constructed at Graffenstaden for the Chemin de Fer de l' Est, is also worthy of notice. The engine has six coupled wheels of 4 feet 8 inches diameter, and the tender also six of a less diameter. The bearings are outside, of good width and the connection is therefore effected by means of overhung cranks, which, by the way, look very heavy for the size of the coupling rods employed, especially those on the axles of the tender. The cylinders for both the tender and engine are placed inside and inclined, and appear to be well fastened to the frames. The diameter of the main pair of cylinders is 16½ inches and the stroke 2 feet. The wheel base of the engine is 13 feet 2 inches and the weight 36 tuns in working order, that of the tender with 1,760 gallons of water, being 26½ tuns. The counterweights on the driving wheels of this engine are arranged in a manner that shows an intelligent comprehension of the action of the moving parts In an inside cylinder engine the center lines of the engines being situated at a considerable distance from the planes of the driving wheels it is evident that a weight situated in either of the latter, cannot counterbalance by momentum an opposite force acting in the direction of one of the former, as the tendency of two such forces would be to produce rotation around a point midway between them. By dividing the counterweight for each engine however, and placing one portion in one wheel and the other in the one situated on the opposite side of the center line, a perfect compensation may be effected. The weights must of course be divided in the inverse proportion of the distance of each wheel from the center line of the engine whose parts we wish to balance. The cranks of the two engines being situated at right angles to each other, we shall have in each wheel two counterweights of unequal size, the larger placed opposite to the crank of the nearer engine and the other at right angles to this, or opposite the crank of the further engine. These two weights may of course be replaced by one occupying a position between the two, determined by the relative magnitude of the original weights, by the ordinary method of the parallelogram of forces, the size of the single weight being fixed in the same manner. It will be seen that the position given to the weights in an inside cylinder engine will be considerably removed from directly opposite the cranks, and therefore an engine having the counterweights placed in the latter position as is generally the case, can not be properly counterbalanced. The same considerations apply to outside cylinder engines, but as in these the plane of the wheel is very close to that of the center line of the engine, the counterbalance of each engine may be almost perfectly effected by a weight in the nearer wheel.

REVERSING SCREW.

The two engines last mentioned are furnished with a screw for reversing, instead of the ordinary reversing lever. This arrangement, first introduced about 4 years ago by Ramsbottom, I believe is now very generally adopted, and I observe that most of the engines exhibited by Continental makers are provided with it. A projecting handle is in some cases applied to the hand wheel at the end of the screw, so that the wheel may be rapidly revolved in reversing. To enable the engine to be reversed in an emergency more quickly than is possible with the screw alone, the lever and screw are in some cases combined, and there are quite a number of engines in the exhibition having such a combined reversing gear varying in the details of its construction. In some, the catch of the ordinary lever is made to drop into the threads of the screw instead of into the notches on an arc, and for this purpose the screw is either made of a curved outline, large in the middle and small at the ends so that its upper surface shall correspond with the arc in which the lever moves; or the screw is fixed but at one end, and is free to vibrate as the lever moves so as to accommodate itself to its position. In others again, a divided nut is employed which is thrown out of gear by the same means that the catch is lifted when the lever alone is used; and this is arranged to slide up or down in a groove in the lever as the latter vibrates. The latter is the form used on the express engine, exhibited by the Paris and Orleans Railway with a few remarks on which I will conclude this letter. It has 4 coupled wheels 6 feet 7 inches diameter, and a single pair of leading wheels 4 feet 1 inch in diameter The cylinders and firebox, as in so many engines, overhang the wheels, the total wheel base being 13 feet 2 inches. The two driving axle boxes on each side are connected by a stiff equalizing beam, and a single spring, placed at the center of its length transmits the weight of the engine to the wheels. The cylinders are outside and of 17 inches diameter by 25½ inches stroke.

SLADE.

The Electric Light.

The British Journal of Photography thus describes the new electric machine of Professor Wheatstone:—

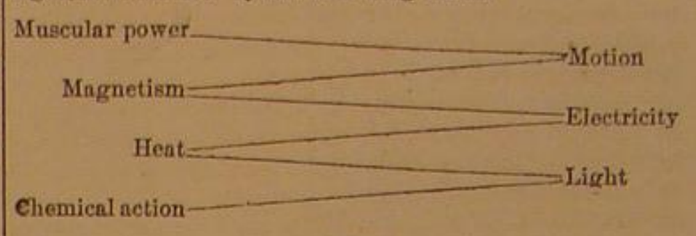
Our ideas of the electric light are almost invariably associated with the recollections of trouble and difficulty often experienced in the management of a large galvanic battery, with its accompanying fittings, acids, and fumes, detrimental alike to the clothes, hands, and olfactory organs of the operator. How different it would be if, instead of the cumberous paraphernalia we had but to turn a wheel, and lo! our sun would send forth his brilliant beams! This is not now a matter of mere theoretical speculation, but is really *un fait accompli*.

In the new machine no magnetism, no electricity, is required to commence the action. Nothing but motion is needed to convert a mass of iron and covered wire into a magazine of intense electric power.

The new machine consists essentially of a bar of iron bent in horseshoe fashion; around this is coiled covered wire, as in an ordinary electro-magnet. Between the poles revolves a spindle carrying covered wire, insulated, but so arranged that either end will be alternately brought into contact with each terminal of the wire surrounding the iron bar. Again: the spindle is so placed that, during its revolution on its long axis, it is made to present each side in succession to either limb of the horseshoe. The spindle is driven by an endless band, which passes around the circumference of a tolerably large flywheel. This is the general construction. When the spindle is rapidly revolved the horseshoe becomes magnetized, a powerful electric current being induced in the wire helix at the same time; and as the motion is continued, the forces go on acting and reacting until a very high degree of intensity is obtained. The electricity can be taken between two terminals placed in proper position. In this respect an important point of difference exists between Mr. Wilde's machine and Professor Wheatstone's inasmuch as in the former any body which we wish to submit to the action of the electric current must form the terminals of the complete circuit, whereas in the new apparatus the substance to be operated upon forms a bridge or short cut for the electricity, in order to complete the circuit.

The power of this apparatus is so great that, even when of small size and easily turned by the hand, it is capable of burning a piece of iron wire thirty inches long and one-sixteenth or more in diameter. In this experiment, at the moment of separation of the fused and glowing iron, the metal scintillates in a very beautiful manner. The same result is also obtained by approaching one terminal, consisting of iron wire, to the second end; the iron immediately takes fire and burns with brilliant coruscations. When the current is made to pass between charcoal points a beautiful and steady light can be obtained. This is the point which chiefly interests us, and we have little doubt that before long we shall have a machine which will be practicably available, and enable us to realize the idea conveyed in the term "turning on the sun" whenever we need additional light.

Finally, we have in the new machine a remarkable illustration of the co-relation of the forces—the muscular power of the human arm being ultimately converted into a brilliant light, as exhibited by the following chain:—



An Electrica Automaton.

There is one giant toy in the center of one of the avenues of the exposition, which as it cannot be classified or included with any other apparatus, may as well be described here. It is a large piece of imitation rock work, about twelve feet high, covered with rich vegetation, ferns and mosses, lichens and orchids; a spring gushes forth from one side, and feeds the pond in which it is placed, and in which gold and silver fish glitter and gambol. Peeping out of one of the cavernous openings at the bottom is a huge black and white Newfound land dog of nature's size and nature's mold, but not of nature's life and blood. The attendant touches a secret spring, and while the admiring observer stays and stares, and feels inclined to pat Pompey's head, Pompey rolls his eyes, opens his mouth, and makes a very good imitation of the deep-mouthed welcome of some watch-dog's honest bark. Startled, but not intimidated, the observer raises his eyes and discovers carelessly sitting on a huge boulder, a hare, which immediately plays a wild tattoo on a drum placed before it, and, ere pussy ceases, a hideous and enormous baboon on one side clatters his jaws, rolls his eyes, scratches his head, and plays a wild and savage air upon a fiddle, while on the other side of the rock some pastoral swain, decked in gorgeous ribbons,

"Recubans sub tegmine fagi,"

bows his head, carefully peeps all around, raises a pipe, and brings forth strains that would melt Coryllis, who sits not far off, had she only life, and who probably, with other figures scattered about the rock, will continue to attract crowds of excited and amused observers of this strange medley of electric agency and skill, during the continuance of the Exhibition.—*Engineering*.

Meterology for May.

Prof. Loomis of Yale College, in his meterological report for the past month, after giving the mean temperature at New Haven as but one degree below the average, the amount of rain as one inch greater than the average, speaks of the unusual preponderance of cloudy weather, the average for the entire month showing that at 1, P. M. three-fourths of the sky was covered with clouds.

The lateness of the season in that locality, as indicated by the flowering of fruit trees has been very remarkable. Peach trees blosomed ten days and apple trees fifteen days later than usual. During a period of eighty-eight years only three other cases have occurred in which the flowering of apple trees was equally late. These facts seem to indicate that the time of blossoming of fruit trees depends not simply upon the amount of heat, but also upon the amount of sunshine.

In Europe we are informed the month of May was uncommonly warm, thus conforming to a rule which has been frequently observed in former years, viz., that the irregular fluctuations of temperature on the two sides of the Atlantic are in opposite directions.

ANOTHER STEEL PROCESS.—Mr. John Calvert, an English engineer, patents a mode of converting iron to steel, the chief peculiarity of which is the minute subdivision of the material by saws or other mechanical means while hot; allowing the particles to fall upon the hearth of a furnace in the presence of an excess of air and other gases such as may be appropriate for the purification of the particular iron under treatment. It is also to be magnetized by electricity or by friction from agitation: this being supposed requisite for producing the proper molecular structure and strength.

A NUMBER of Californians are organizing a company with $500,000 capital to buy up good lands to sell again to actual settlers, at long credits and low interest, together with seed, farm implements and live stock; manufacturers will also be encouraged.

Editorial Summary.

MR. JAMES PARKER, a gentleman residing near London, has lately introduced a system of working engines by mixed steam and air, which he applied to the propulsion of a small road locomotive some time ago, and more recently for propelling a small vessel on the Thames. The results of these experiments were very satisfactory, and the subject has recently attracted no little attention.—*Exchange.*

[The above is a Yankee invention, quite old. It is the Cloud engine, invented by Wm. Mount Storms, and was publicly exhibited at the Crystal Palace, in this city and other places, ten or twelve years ago

AMERICAN GUNS.—One of Captain Ericsson's communications to the Government of his native country on naval improvements has been made public in Europe, and is highly instructive as to the merits of different systems of heavy gun making. The trial of the 20-inch guns at Fort Hamilton in March last, furnishes him with data for comparing the performance of these guns with the best English wrought iron rifled cannon. By the trials at Shoeburyness, the initial velocity of the 511-lbs. rifled shot from the 13½ inch Armstrong gun being 1,250 feet in a second, its actual force is computed equal to 12½ millions of foot pounds; since a body moving at a velocity of 1,250 feet per second has the force acquired by a body falling *in vacuo* 24,414 feet, or 24,414 times enough to raise its own weight one foot. On the other hand, the force of the 20-inch, 1080 lbs. shot, with the proved initial velocity of 1,400 feet, is computed by the same rule at 32½ millions of pounds. The area of the English elongated shot exposed to direct atmospheric resistance is 143 square inches, and that of the American spherical shot is 314 inches; considerably less difference against the American shot than the computed force shows in its favor, without charging to the English shot the friction of the atmosphere against its long sides. The worst of it is that this, by far their most powerful gun, has not yet been made reliable.

ELECTRO-CASTING.—Statues and other fine models in metal are made with microscopical exactitude in the fine-art foundery of Messrs. Elbington at Birmingham, by electro-casting *i. e.*, precipitating the metal from a state of solution upon the surface of the mold by electrical decomposition of its salts. In order to do this, the mold itself is first produced by the same process. The object to be copied is made impervious to moisture, and then coated with fine black lead. Placed in a copper solution, it is electrically coated with the metal to a sufficient thickness to retain its form when removed, and is then divided and taken off, or the model is removed from within. Its interior is, of course, a surface negatively identical with that of the model, and on being filled with a solution of bronze, and submitted to the battery, receives a deposit of bronze, the form of which is not to be distinguished from the original by the finest scrutiny. These casting are usually made one-fourth of an inch thick, but the thickness can be varied at will, requiring weeks or months, according to the thickness. Unlike other modes of casting, in this there is no imperfection from the distortion either of the mold or of the casting, nor from imperfect filling of the finest lines of the mold,

POWER OF INVENTION.—The last two great wars have illustrated in a new light the fact that one thought is mightier than a million arms. The inventor and the engineer fight the battles as well as do the work of the world. If there are exceptions and limitations to this statement at present, they are rapidly giving way before the advance of science, and the time is coming when they will be no more. We have only to suppose the inventor of the needle-gun to have been an Austrian or a "confederate" to perceive how the condition and future of either hemisphere might have been reversed through the agency of one man. Had the monitor sprung full-armed from a Southern instead of a Northern brain, where now would have been the United States? But there were reasons for these things as they were. Both Austria and the old South were narrow and non-progressive systems which could not breed invention, and would not honor the industrial arts. The future policy of nations is too plain to be missed by a plain man, however theorists may obscure it. Only those who most successfully cherish, most determinedly grasp, the whole system of arts and manufactures, will hereafter be strong or secure.

PAPER BOATS.—In an article last week on the applications of paper, we might have added, among its other uses, its substitution for leather, as machinery belting, a patent for which has just been granted, and its peculiar adaptability for the manufacture of shell boats for racing. A boat maker of Troy has lately constructed one thirty feet long, which weighs but forty pounds, and is in every respect superior to boats made of wood. It is thin, lighter than a wooden boat, is rendered impervious to water by a coating of oil and other compounds, and is claimed to be more durable, and that it will stand shocks that would destroy a wooden shell. Such a boat cannot be split or broken, but if a hole be made in it by accident, the perforation will be no larger than the size of the object piercing it, and could be easily mended; it will not swell nor crack, requires no caulking or pitching, and, above all, the cost is much less than a wooden boat.

MERCURIAL VAPORS.—M. Boussingault has laid before the French Academy of Sciences his researches into the effects and counteractions of the vapors of mercury, which destroy or reduce to imbecility and misery so many lives in certain branches of manufactures. The deadly influence of these vapors on plants, and the effect of sulphur in neutralizing them, had been carefully defined. Regnault considers the best reagent against the vapors of mercury to be an iodized daguerreotype plate, but Boussingault maintains that the sensibility of the plates is as nothing compared with that of plants.

PROFITS OF BEET SUGAR.—Mr. Grant's work on the beet sugar manufacture gives the following estimates of business on a capital of $200,000 in buildings and machinery, and $100,000 cash:—

Cost of 24,000 tuns of beets, at $4		$96,000
Cost of manufacturing		98,800
		$194,800
Returns—1,650 tons of sugar, at 8 9-10 cents per lb	$326,000	
720 tuns molasses, at 4 cents per gallon	7,200	
4,800 tuns pulp for feed, at $2	9,600	
		352,800
Profit		$158,300

MISCELLANEOUS.—The importation of opium into the United States increased in twenty years, 1840 to 1860, from 24,000 lbs., or a pound for every 750 persons, to 110,500 lbs., or a pound for every 285 persons; the whole increase, at least, an unmixed evil.——Mr. Ridgway, the zoologist appointed to accompany the Government exploration of Russian America, has arrived in California. When on that coast before, he found birds nearly identical with living species in Asia, none of which are found on the eastern coast of America.——A committee of the English Parliament reports that at least one-third of all the fires in London are intentionally lighted for the purpose of defrauding insurance companies; mostly by "gangs of foreigners" who follow this as a business.——The *Colonist*, the oldest and most widely circulated journal in Vancouver Island and British Columbia, says that "nine out of every ten men in the Colony would welcome annexation to the United States." No Vancouver Island journal denies this.——Germany has co-operative societies numbering 350,000 members, with yearly returns of large profits.——A number of Californians are organizing a company with $500,000 capital to buy and sell good lands to actual settlers at long credits, and low interest, together with seed, farm implements and live stock. Manufactures will also be encouraged.——The progress of France in fourteen years past (1851 to 1865), is illustrated by the increase of annual imports from $207,860,000 to $670,320,000, while the exports increased from $298,800,000 to $776,530,000, and the total commerce was nearly tripled; the clearances of shipping increased 50 per cent, the miles of railway were quadrupled (2,187 to 8,750), the miles of telegraph went from 1,875 up to 19,688, and the business of the Post Office and the bank of France were each multiplied more than five times.——Arbitration Boards between employers and workmen have been formed in the hosiery trades of Derby, Leicester and Nottingham, and are contemplated in the lace trade.——The *Great Eastern* has been seized under four warrants in as many actions, or claims for towing, supplies, and seamen's wages, the latter alone amounting to some $20,000, and the whole amount to nearly $40,000. The creditors who have recourse only to the assets of the Company, find them to amount to perhaps $150,000, while their liabilities are estimated not far from five times as much.——The largest topaz known was lately deposited in the Bank of France. It is from Brazil and measures 7½ inches in length by 4⅝ inches in width and thickness, and weighs over 3½ lbs.——The British Admiralty have taken the (to them) novel step of addressing a circular to all the eminent shipbuilders and engineers of the country, asking for plans and estimates for iron-armored ships of war, embodying the best combination of improvements according to the judgment of the designer. Turret or other plans are invited, but not less than two turrets are deemed admissible.

BUSINESS AND MANUFACTURING ITEMS.

IRON.—Dublin (says *Engineering*), is the first British city, except London, that has taken steps to procure a second steam fire engine. In America, it would be hard to name a city, above fifth rate, that has not long since gone beyond its "second."——A Paris order per cable for ten Crompton looms has just been received at the works in Worcester.——The New York Watch Company is to adapt and occupy the works of the American Machine Company, at Springfield, Mass.

LEATHER.—Tanning with "hard hack" bark has been tried, with reported excellent success. The bark is steeped without boiling, and tans calfskins in three days, the leather being equal to the best imported, according to the *Shoe and Leather Reporter*.——The aniline dyes now enable the morocco manufacturers to give to their products almost all the variety and brilliancy of shades that are to be seen in any kind of dyed fabrics. Hence the growing fashion of fancy colors and decorations in ladies' shoes and other articles of leather——Paris is the greatest leather center of Europe, having the most varied assortments in all styles.——The suggestion has been broached to found a school of tanning, with the double object of educating competent hands for the convenience of manufacturers, and of bringing the art in this country up to the highest standards of Europe, and rendering us an independent and even a leading nation, as we ought to be, in this respect.——Sheffield's machine for quilting boot soles with wire, is to be manufactured at Hopkinton, Mass., by a new company with a capital of $500,000.

RAILROADS, ETC.—A pneumatic dispatch tube is proposed between Jersey City and Newark. The company are now raising capital under a charter granted by the Legislature of New Jersey.——Railroads carrying the mails are now required by the Post-office Department to prepay their mail matter over their own roads, the same as other parties.——One of the telegraph companies proposes to take night despatches (handed in during the day) with twice to three times the number of words allowed by day for the same price.——The highest average speed of English express trains is 40 miles an hour; ordinary trains, 18 to 30 miles; French express, 35 miles; ordinary, 16 to 25; Prussian, express, 29 miles; ordinary, 17 to 21; Austrian express, 29 miles; ordinary 14 to 21; Italian express, 30 miles; ordinary, 15 to 24.

MINING.—The Canada Gold Mines now number 73; the miners, 708. The yield of gold for the last three months is estimated at $690,955.——New diamond localities have lately been found in California. There are fifteen places in that State where diamonds have been found in washing for gold.——The Missouri Mining Bureau has been organized with a capital of $2,000,000, for geological and mining surveys, opening and working mines and metallurgical establishments, erecting buildings and making and operating roads of all sorts, manufacturing, publishing a newspaper, and in short, doing anything in the world not inconsistent with the constitution and the laws of the State of Missouri.

MISCELLANEOUS.—The Northwest Manufacturing Company of Chicago have thrown their business into a co-operative concern, charging ten per cent on a capital of $100,000 for interest, insurance, and taxes, and on the other hand paying regular wages on the ten-hour system for work, and at the end of the year dividing the nett profits of the business equally with their workmen who sign the articles of association. The latter can invest their dividends as capital in the concern, if they see fit.——Female domestic labor in Colorado commands $40 to $50 a month, and is scarce at that.——Wooden pavement men may profitably study the case of a creosoted sleeper recently taken up in Scotland after 21 years service as fresh and tough and smoky-smelling as ever. The original cost of the creosote used was ninety cents.——Some of the journeymen trunk makers of New York have taken steps to follow the example of the 25 printers and form a co-operative establishment.——The business of the Russian American Trading Company in ten years, from 1850 to 1860, is stated at $6,426,413 in receipts, and $1,017,000 in divided profits; the capital having been in 1833 about $2,000,000.——The distillation of pine wood is carried on in New Orleans, realizing, as reported, from a cord of "fat" pine 40 gallons of turpentine, 1 barrel of rosin, 1 barrel of pitch, 100 gallons of pyroligneous acid and 50 bushels of charcoal; the whole worth $60 and costing $10.——There are in the State of New York 372 cheese factories which work up the milk of 168,166 cows. The other States and Canada are reported to the American Dairymen's Association as containing 114 factories and employing 53,927 cows, of which Ohio has nearly three-fourths, while New York has over three-fourths of the whole.——The firing of the converted Snider-Enfield rifles by the 83d regiment at Gibraltar, proved very satisfactory, the independent firing sounding like one long, continuous volley——The preservation of milk in cans from which the air is expelled by heat, as in canning fruits, has been tried with success by a M. Malrun, who has received a prize of 1,500 francs therefor from the Academy of Sciences. The milk was found by the Committee quite fresh and sweet after six months preservation.——Hammonton, N. J. (says the *Culturist*), contains perhaps the largest breadth of land in one body set apart for small fruit, to be found in the United States. Within a space of say three miles square, nearly a thousand acres are devoted to strawberries for the New York and Philadelphia markets. Ten years ago, this great garden was a wilderness without inhabitants, and the first settler, Capt. Fay, was obliged to beg of the railroad company, as a favor, to stop a freight train there and let him throw off into the woods the materials for the first building.

CURRENT RECIPES.

TO PURIFY WATER, by a process promulgated by a Mr. Booth of Birmingham, put in it a neutral solution of bi-sulphate of alumina, in the proportion of one ounce to 435 gallons. The sulphuric acid of the sulphate decomposes the bi-carbonate of lime in the water and forms an insoluble sulphate of lime instead. The hydrate of alumina being set free, forms with the organic matter in the water another insoluble compound. Both these fall to the bottom, and the remaining freed element, carbonic acid, lends an agreeable quality to the water.

A WHITE PASTE, adhesive to all surfaces, is said to be made as follows:—A solution of 2½ ounces gum arabic in two quarts warm water, is thickened to a paste with wheat flour; to this is added a solution of alum and sugar of lead, 720 grains each in water: the mixture is heated and stirred about to boil, and is then cooled. It may be thinned, if necessary, with the gum solution.

COAL TAR is recommended in the *Chemical News* as an excellent coating of cisterns and reservoirs, to protect water from the lime and other salts contained in the cement. The tarry taste, if we may believe the writer, disappears in a few days.

PICKLING VEGETABLES, as well as salting meats and tanning leather, is effected without loss of time by the pneumatic process: exhausting the air and letting in the liquid under atmospheric pressure so as to force it instantly through the opened pores and cells.

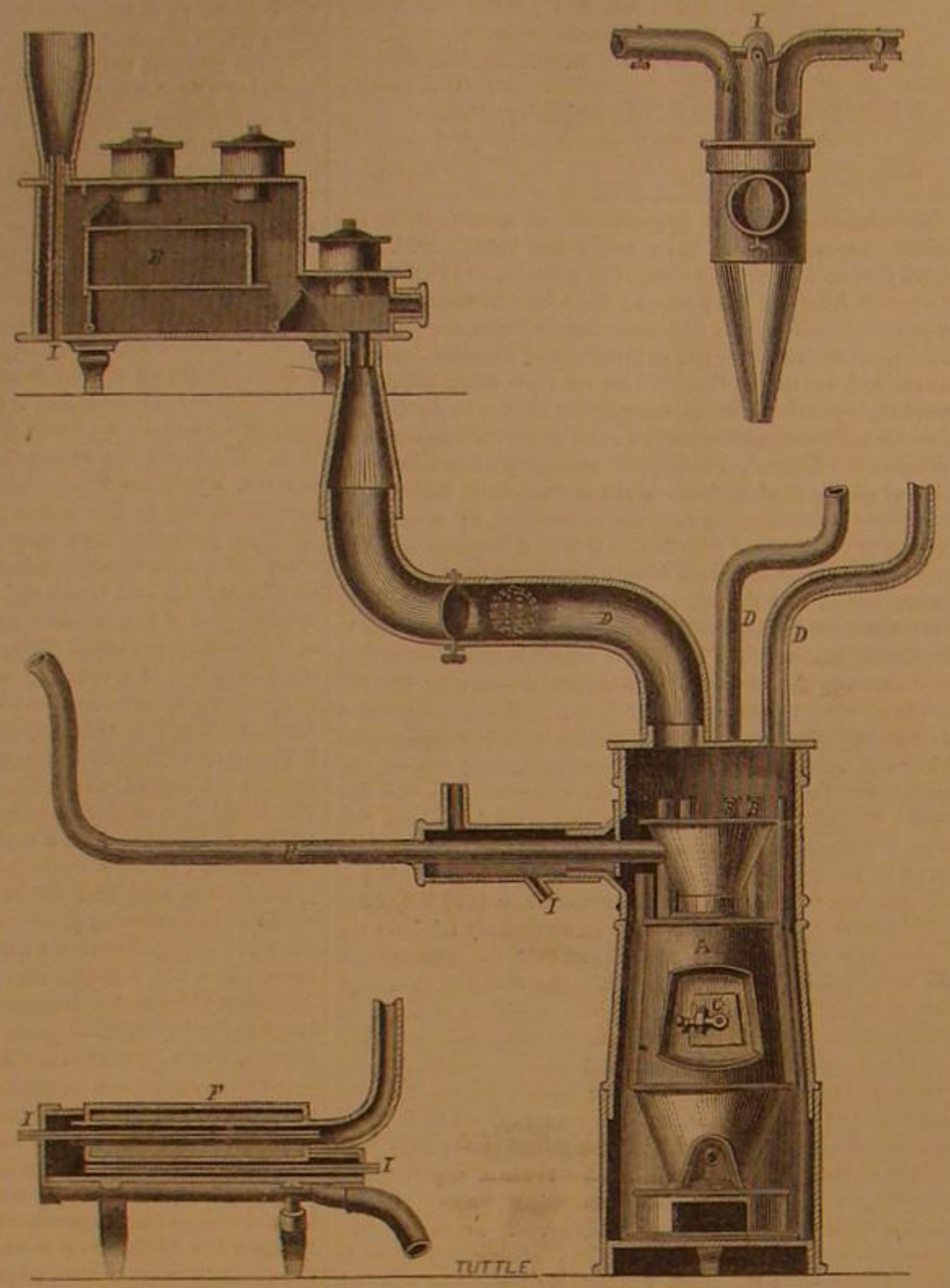
PUTTY FOR STOVE JOINTS may be made by wetting together fine salt with double its bulk of fresh hard wood ashes. If a harder cement is wanted, use iron filings with white lead and linseed oil. It should have a day or two for hardening

TO CUT GLASS to any shape, without a diamond, hold it quite level under water, and with a pair of strong scissors clip it away by small bits from the edges.

A PUTTY of starch and chloride of zinc, hardens quickly and lasts for months, as a stopper of holes in metals.

Improved Heating Furnace.

The engraving represents a furnace for heating apartments and for cooking purposes combined, which was patented through the Scientific American Patent Agency, Oct. 24, 1865. The invention consists in the use of separate tubes introduced into the heating chamber of the furnace, so that each apartment is supplied with heated air by independent pipes; in the employment of air tubes of comparatively small diameter passing from the external air to the interior of the heating pipes, and in the application of the heated air from the furnace to culinary purposes, after which it may be used for other purposes.

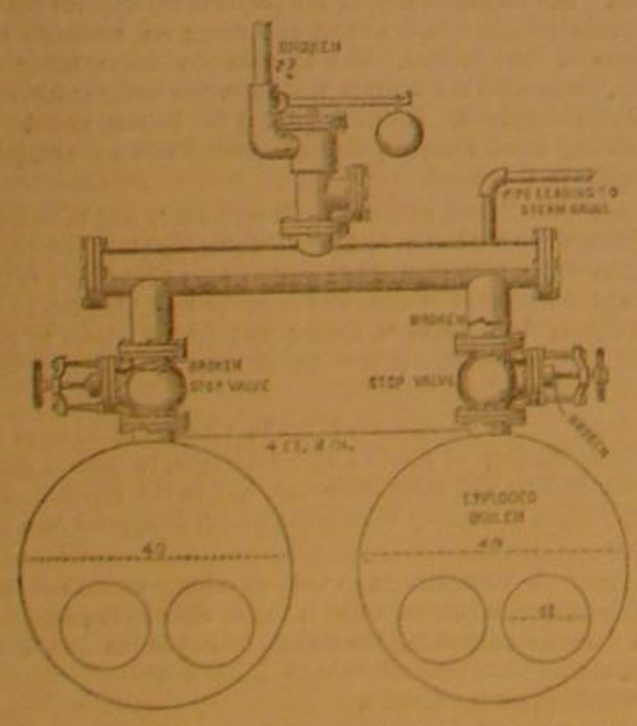


A, in the large figure, is the fire chamber of a furnace which rests on a bottom plate, into which are inserted tubes, B, surrounding the fire box. The furnace is supported on legs and the whole is inclosed by a drum which has a door to correspond with the door, C, and an opening for the admission of air below the fire box. The air thus admitted is divided, so that a portion of it passes into the space between the furnace and the outer drum, and another portion passes into the pipes, B. The pipes, D, conduct the heated air to different apartments or to a cooking stove, seen at E, on an upper floor, or to a baking oven or a boiler for heating water, designated by the letter, F. From either of these the heat may again be passed to other apartments by means of the funnel and pipes, G, which may be attached to the stove, oven, or boiler The pipe, H, attached to the inverted cone over the fire box conveys the smoke to the chimney flue. Small air pipes are introduced into the hot air flues and into the pipes of the boiler, F, having their outer ends extending into the external atmosphere. They are seen at I in the different figures. The object is to increase the combustion of the gases and the draft. Dampers are located at any points required to regulate the flow of the external air admitted or the heated air generated.

Further information may be obtained of Silas Bennett, the patentee, at Newcastle, Pa.

THE BOILER EXPLOSION IN PHILADELPHIA.

The ostensible facts in regard to the terrific boiler explosion which occurred in Sansom street, Philadelphia, on the 6th of June, are already familiar to our readers through the medium of the news journals. By this lamentable accident not less



than twenty-eight persons were killed and seven seriously wounded. Out of forty-three within the immediate limits of the disaster only eight escaped. One of two boilers exploded, when, according to the statement of the engineer, taken while in hospital, the steam gage showed only one pound of steam! The wonder at the discrepancy of this statement, even if allowed to be correct, with the fact of the explosion, will be greatly mitigated by an examination of the accompanying engraving taken from a diagram in the Philadelphia *Inquirer* and corrected by a sketch from a correspondent.

It seems that the two boilers were connected, as to their steam space, by a pipe, the connections of which with the boiler supported gates or stop-valves, by operating which either one or the other of the boilers might be used.

In No. 23, current Vol., we had an article under the head of "Boiler Feed Pipes, Check Valves, and Cast Iron Heads," in which we spoke against the practice of placing boilers in nests with improper connections. Our somewhat censorious remarks are supported by the facts, so far as we can gather them, in relation to this Philadelphia disaster.

It seems, by an examination of the engraving, that the only tests as to the condition of the pressure were placed at points entirely independent of the boilers; or that no test of the pressure on the boilers could be absolute, as the management of the gates was left to attendants. As one of our correspondents says, "there were two boilers set side by side, connected by a cast iron pipe, from the steam spaces near the front heads, with one safety valve and indicator gage, not in immediate connection with the boilers, but having gates, or stop-valves between the boilers and the steam pipe to which they were attached."

Certainly if only one of these gates was closed the indication on the steam gage would reflect the condition only of one boiler. Suppose both to be closed, as may be inferred from the statement of the engineer as given in one of the dailies, and the fact that only one pound of steam was shown is readily accounted for.

It is unnecessary to go further into this subject, as all mechanics will readily, from an examination of the engraving, be able to arrive at a correct opinion in regard to this latest lesson on boiler setting, on which subject we shall at no late day have a few remarks to make.

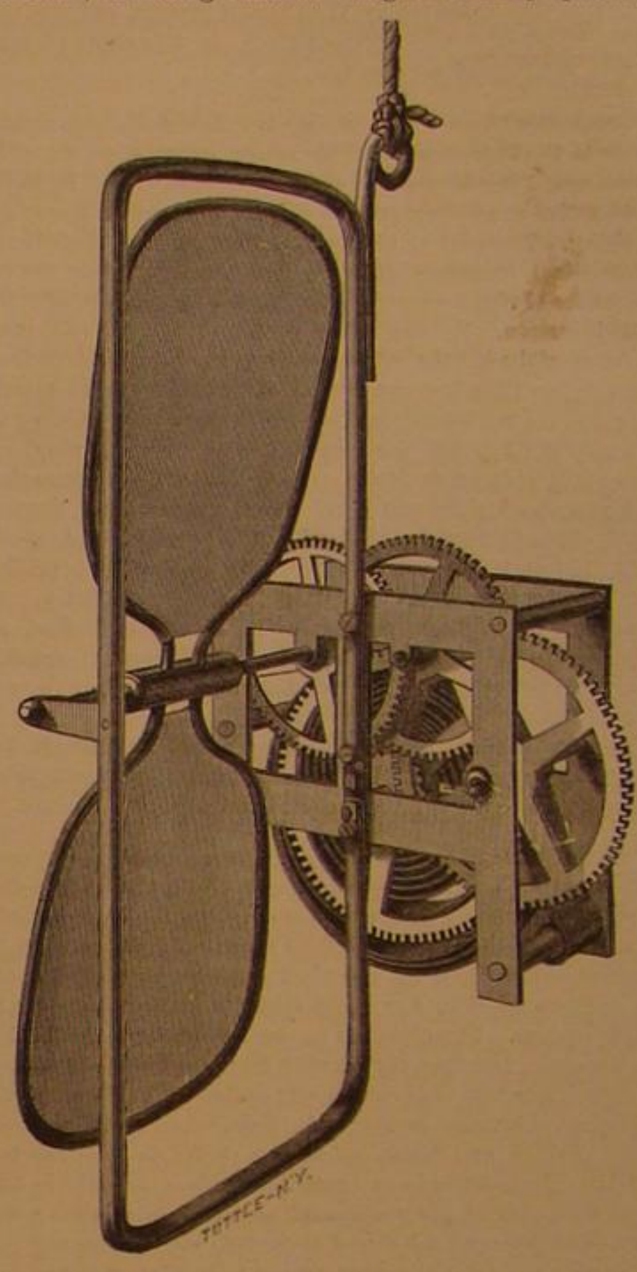
BENNETT'S APPARATUS FOR UTILIZING HEAT.

LUNDBORG'S IMPROVED AUTOMATIC FAN.

The object of this invention is to furnish a self-acting fan, to be suspended from the ceiling by a cord, over beds, dining-tables, surgical chairs, in theaters, public halls, mining tunnels etc., and consists in the fan attachment to clock or cog wheel movement, propelled either by one or more springs, or by weights.

The engraving sufficiently shows its construction and mode of operation. The fans, two or more, are suspended in a frame and driven by ordinary clock work. It can be used in almost any position or locality required; it can be raised or lowered at pleasure, so as not to obstruct the light if a person desires to read, or occupy space which could possibly be desired for other things. It will cause a continual current of air to pass directly over the head of a sleeper, without the danger of an open window draft. It will drive away musquitoes, and other insects, thus giving all the advantages without the oppressiveness of a musquito bar.

Over Surgical or Dental Chairs.—Being suspended directly over the head of the patient, it refreshes both him and the operator without being in the way of, or impeding the movements of either; Over Dining Tables.—Being suspended at various intervals, over the middle of long tables, a perfect draft will be created; flies will be dispersed, and useful space will not be occupied; In Parlors.—They can be suspended so as to be both ornamental and refreshing. Bouquet vases may be attached, thereby imparting the fragrance of flowers to the circulating air; In Dancing Halls and Theatres.—Large sized fans can be so distributed as to make the air circulate freely through the largest halls, without in the least obstructing the room; In Mining Tunnels.—Large sized fans propelled by



clock weights, can be so arranged as to create a perfect current of fresh air, dispelling all impurities.

In the Southern States, East and West Indies, Mexico, South America, and in fact, all hot climates, this invention must be useful.

It was patented Feb. 26, 1867, through the Scientific American Patent Agency, for J. A. W. Lundborg and Chas. W. Sanger of San Francisco, California. For further particulars or for exclusive right of manufacture, apply to Dr. Eugene F. Sanger, Bangor, Maine.

AN IMPROVED POCKET KNIFE.

One of the neatest and most convenient devices we have seen is an improvement in pocket knives recently patented through the Scientific American Patent Agency both in this country and Europe, by Mr. William Sausser of Hannibal, Marion Co., Mo. Instead of being secured to the handle in the usual way the shank of the blade has a curved or angular slot extending from the usual place of the rivet out through the edge of the shank on the side nearest the blade's edge. By means of this slot one blade can be removed instantly and replaced by another. To effect this removal where the back spring is quite stiff, the inventor has contrived a neat spring holder which takes the tension of the spring from the blade, or the shank of the blade may be so formed that the tension of the spring upon it when closed is very slight, and in that position it may be slipped out and another blade inserted.

This will prove an admirable contrivance for surgeons, gardeners, farmers, and others who require a number of different blades, as a handle of convenient size and form will serve the same purpose as one containing a number of fixed blades or as several separate knives. Its intrinsic utility will probably secure for it a very general adoption.

A WANT SUPPLIED.—In No. 24 current Vol. we published the expressed desire of a correspondent for an improved tobacco pouch. Since that was written we have seen and used a pouch that appears to be exactly what is wanted. It is a bag of any proper material having a mouthpiece with a projecting annular lip to engage with the pipe bowl, and inside is a rammer worked by a button or knob on the outside of the bottom. With this simple contrivance the smoker may load his pipe in a gale or in the dark without wasting a particle. It was patented Feb., 1867, and can be obtained of the agent, Wm. A. Hammer, 448 West street, New York.

THE Industrial Art Schools of France are to be imitated in England. A provisional committee was appointed and a subscription opened at a meeting of English gentlemen in Paris a few days since.

THE WORKING GENTLEMAN.

The children of luxury and pride are not the only ones who need to be taught the dignity of labor. The sons of toil themselves do not always appreciate their work and station duly. We see this in various ways: sometimes in a jealous and envious aspect toward the rich, sometimes in a cringing and sometimes in a defiant attitude toward employers, and often in a sensitiveness with regard to their social position which is quite opposite to conscious dignity and genuine self-respect. False pride perhaps finds its deepest disguise often in the best working men, in a repugnance to the cultivation of taste and courtesy, as something out of caste and character for them.

In such sense as pride is permissible, a man should be unaffectedly proud of his industry, his usefulness and his self-denial, and placidly despise the gilded opposites of these, which men are prone to worship or to envy. He should realize that these qualities are so much more honorable than all others, that it makes no practical difference, in the comparison between men's stations, *what* their work is, so long as it is nobly done. Truly said the poet—

> Honor and shame from no condition rise:
> Act well your part: there, ALL the honor lies.

It is not, therefore, especially for the discipline of dainty coxcombs, who seldom come within our reach, that we reproduce the hearty lashing which the Charlottsville *Chronicle* administers to the young men of the South. It is good for false pride and effeminacy in all latitudes, whether swelling in broadcloths or fretting under denims.

"There is a vastdeal of idleness in the South. There are young men pretending to practice law or physic: young men instructing a half dozen pupils; young men selling a few yards of ribbon per day; young men who have no business there, at college: young men "farming," all of whom ought to be differently occupied. There are young men clerking it in hotels and banking companies where there is not full employment for them. There are young ladies by scores engaged in reading novels, or entertaining beaux. There are all sorts of agencies, ten thousand shifts to live, no matter how, so that it is not by manual labor. In a word, the market of head-work is glutted in the South, while the hammer, the plane, the trowel, the hoe, the ax, are crying for stalwart arms to grasp them.

"The idea is that a trade is not just the thing for a young man who considers himself as good as anybody. It is thought a better thing to be a jack leg lawyer, or to murder people with a doctor's diploma, or to weigh butter, than to build a house, or make a sewing machine, or construct a steam engine. The agent of somebody's vegetable pills is thought a more eligible match for your daughter than the man who prints a newspaper or a book. So it is a foolish and often fatal pride which makes thousands shrink from the mechanic arts; and those very men who, by a life of honest industry, have secured a high position in the community, and a respectable competence for their families, turn their backs upon their occupations, and trim their sons out for something that will not soil their white hands. We shall not prosper in the South until all these folks go to work, nor until labor with the hands is properly estimated."

THE MANUFACTURE OF STRAW GOODS IN THE UNITED STATES.

Thomas Coryat, the "Odcombian leg stretcher," as he was pleased to call himself, because of his extended pedestrian tours throughout Europe, in a narration of his travels published in 1611, states that "delicate strawen hats" were worn by men and women in some parts of Italy, particularly in the country around Piedmont. This is the earliest record we possess concerning the plaiting of straw, although undoubtedly practiced by the inhabitants of tropical climates for all ages. Indeed the first plaited goods made in this country were the work of the negroes brought over in the slave ships, who, it is related, of their own accord betook themselves to the manufacture of round hats from the inner lamina of the palmetto bark.

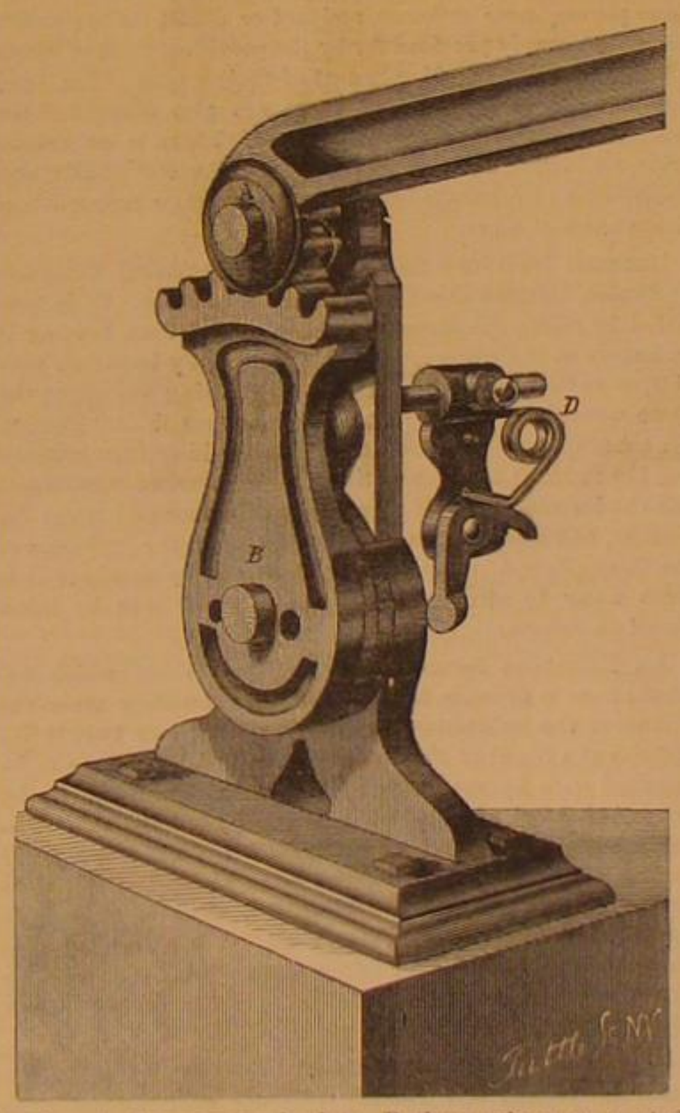
Hats and bonnets of Leghorn first became favorably known in England in the eighteenth century, and straw from that country was introduced with the Italian mode of working. Native grasses were also employed, although being much larger in size than the Italian, goods made from them had a clumsy appearance until the plan was adopted of splitting the straws. The neighborhood of Dunstable, England, for nearly a century enjoyed a wide celebrity for the excellent hats made from wheat grown on the chalky soil of that locality. It was one of these famed bonnets exposed for sale in a store in Providence, R. I., that in 1781 attracted the notice of Miss Betsey Metcalf and induced her, without instruction or any opportunity of unbraiding a plait, to attempt and successfully accomplish the task of making for herself a similar hat of oak straw, which she cut, smoothed and bleached in sulphur fumes. A *fac simile* of this bonnet is preserved by the Society for the Encouragement of Domestic Industry, and is regarded with the greatest interest as being the germ which has since developed into an extensive branch of industry. By the exertions of this lady the trade of straw working became quite common, especially in the New England states, and thence gradually extended throughout the country. In 1801 the first manufactory of straw goods was started in the town of Wrentham, Mass. This for many years continued to be the leading establishment in the country.

In consequence of heavy importations of common straw goods made by the cheap labor of the Irish, attention was turned to the closer imitation of the Leghorn hats, then so highly prized. The initiative in this matter was again taken by a lady residing in Weathersfield, Conn., who in 1821 laid before the London Society for the Encouragement of Arts and Manufactures a bonnet which the London dealers declared equalled in firmness and color the best imported Leghorn. The material employed was the culm or stalk of the indigenous spear, wire or meadow grass, a species of *poa*. Stimulated by success and the extravagant prices which were readily obtained for nice work, other native grasses were experimented upon, and new manufactories sprang up in all sections of the country. In 1840 the total value of straw bonnets and hats made in the United States was $1,476,500 According to the last census seven thousand hands were employed in the large manufactories of straw goods, turning out five million dollars worth of goods yearly. This is exclusive of the palm-leaf-hat manufacture, which would increase this sum nearly a million. The finer braids or plaits used in making up bonnets or hats, are still largely imported from Italy, Switzerland, China and Great Britain, and some of the coarser braids are brought from Canada. The annual valuation of hats and bonnets of Leghorn, straw, chip, grass and other vegetable materials thus imported is given by the authority before quoted as $1,603,239. New England, and particularly Massachusetts, is the section most interested in the straw manufacture, and through the country towns and villages great numbers of women and children find remunerative employment, who are not classed as operators in the figures given above. A later estimate gives the production of Massachusetts at 6,000,000 hats and bonnets annually. Philadelphia sends out goods of this class valued at over $600,000 every year.

LYON'S MACHINE FOR CUTTING STUBS.

The engraving shows a very handy machine which will be appreciated by blacksmiths, machinists, and iron fence makers. It is a contrivance for cutting "stubs" from the bar for the connections between the bars of iron fencing, and for cutting wire and small iron into convenient lengths for many purposes.

The stand of cast iron supports at the top a pinion, A, which is a portion of a hand lever, by working which motion



is given to the segmental plate, B, that swings on a stud. The inner face of this plate and that of the stand have hardened steel dies, beveled by their edges across their seats and their faces working in close contact. A hole on each side of the pivot of the plate, B, passing through plate, stand, and dies, receives the iron to be cut. The gage for length of the stubs is seen at C. It can be adjusted by a set screw or swung out of the way as may be desired. The lower part has a pivoted bell crank lever, one end of which forms the stop and the other engages with a spring, D, which holds it in place, and yet yields sufficiently, as the iron is fed in, to allow the stubs to drop as they are cut. The operation is readily comprehended. The iron is passed through the holes when the plate, B, is in an upright position, bringing the holes in the parts in line, and then an elevation or depression of the lever severs the rod, the action being analogous to that of a pair of shears. The machine is portable, or it can be secured to a bench for shop use. When the dies are dull it is an easy matter to remove and repair them.

It was patented through the Scientific American Patent Agency May 28, 1867, by Warren Lyon, whom address for other particulars, 25 Eighth Av., New York city.

BINDING.—Subscribers wishing their volumes of the SCIENTIFIC AMERICAN bound can have them neatly done at this office. Price $1 50.

LABEL FOR PLANTS, SHRUBS, &c.—It is said that zinc plates written upon with a common lead pencil, forms an enduring label.

BRIQUETTES.

One of the best illustrations of the utilization of waste or valueless products to be seen at the Paris Exposition, is the collection of artificial fuels there exhibited. Belgium, France, and Austria, who have taken the lead in this matter, contribute as the results of their experience, samples and models of machinery for the manufacture, from hitherto useless substances, of a cheap and valuable fuel for industrial and domestic purposes.

The principle of making refuse combustible materials cohere by incorporating them with some adhesive substance, forming thereby a solid mass of artificial fuel, has been practiced by the Chinese and other nations for centuries, but the special interest of these samples lies in the employment of improved cementing materials. Although the particles of some kinds of bituminous coal will cohere when subjected to pressure at a slightly elevated temperature, forming a block of considerable strength, to stand rough handling in transportation, some cement must be found which will more firmly bind the coal particles together. Common clay was first used for this purpose, but being itself incombustible, the large amount of ash formed proved objectionable, and recourse was had to coal tar with excellent results. In the countries referred to above, where this kind of fuel, under the name of briquettes, or carbon aggloméré, has been extensively experimented with, a residue in the manufacture of starch has been lately employed as a cement, a substance valueless for other purposes, and having advantages over clay in that it leaves no ash, and does not, like the coal tar, melt and thus lose part of its binding effect at a high temperature.

The form of the fuel depends upon the kind of machine used in compressing it. In M. Evartt's machine, which is very highly spoken of, the material is forced through iron tubes, so that the fuel has the appearance of a log of wood. M. Mazeline's appears to be constructed similarly to a model brick machine, the material being fed into prismatic molds and compressed by a square piston in each. While still damp, these blocks are placed in a kiln and warm currents of air are passed over them for the space of three hours, when they are ready for use.

Another machine exhibited is that of M. Dehaynin, being a modification of the one first mentioned. With its engine and all accessories a machine capable, with an eighty-horse motive power, of turning out ten tuns of fuel per hour—weighs sixty-five tuns. M. Dehaynin's works furnished 175,000 tuns of this fuel last year, which he sold to railroad companies, the navy, and a large quantity for household purposes. The samples sent by the Northern Railway Company of Austria, made at their coal mines at Ostraw, in Moravia, are prismatic in form, weigh about eight pounds each, and in actual practice on locomotives, are found to evaporate from 7·1 to 7·2 pounds of water per pound of fuel. The annual production from these works exceeds 170,000 tuns.

The saving of space in storage, from the compactness of this fuel, is in itself a great recommendation, the cost is trifling when compared with ordinary coal, while its convenient form, cleanliness, and high heating effect have given general satisfaction wherever it has been introduced.

Magnesium and Magnesium Lamps.

Some contrivance is much wanted to get rid of the copious though harmless, white smoke given off by burning magnesium. No apparatus for doing so, except the long expanding chimney already mentioned, has yet been introduced into the market. As the smoke is nothing but freshly calcined magnesia, which can be chemically altered by scarcely anything but acids, and is insensible to the action of the intensest heat, the problem is a difficult one. It is found in the present lamps, to very quickly coat the metallic sides of the chimneys, so that fixing a box with partitions above the chimney, smoke being made to take a circuitous route will encounter a very large surface on which much of it will be deposited, and the rest escape. Shallow dishes filled with weak sulphuric acid, placed on each of the interior shelves, would still further absorb the smoke. Mr. Larkin has tried many experiments to consume the smoke by causing it to roll over a large surface of felt soaked in weak acids and fixed in cylindrical chimneys. He has also exposed the smoke in the chimneys to slowly running or trickling streams of weak acids. In some of the experiments about seventy-five per cent of the smoke was abolished; still no apparatus has been introduced by anybody to practically and economically get rid of the smoke of burning magnesium. In one of the experiments made by Mr. Larkin he employed felt soaked in weak acetic acid, and was much surprised to see the smoke which did escape turn over the side of the chimney and fall down on the table, instead of rising to the ceiling as usual. He attributed the phenomenon to the partial decomposition of the volatile acetic acid into heavy carbonic acid gas, which fell over the edge of the top of the chimney and carried down smoke with it. Possibly, by following up the clue given by this experiment, a smoke consuming chimney can be made in which the smoke shall fall into a proper receptacle, now that it is proved to be possible to separate it from the upward flow of warm air.

Mr. Samuel Mellor, the manager of the Magnesium Metal Company, has made many experiments with the alloys of magnesium with zinc, tin, antimony, copper, thallium, lead and other metals. Some of the results obtained were curious. An alloy of lead and magnesium burned very slowly; an alloy of ten per cent of zinc and magnesium had a specific gravity considerably greater than that of the two metals when isolated; a fifty per cent alloy of zinc and magnesium was found to be more brittle than glass; an ingot half-an inch in diameter, when allowed to fall upon a stone floor broke in pieces, and the fragments were easily pounded to dust in a

mortar by hand. The alloys of magnesium with zinc are variably acted upon by acids, some of them dissolving with violent ebulition, and others in which the proportion of zinc is large, being nearly or quite insensible to their action. These alloys with zinc all burn readily, but the flame though brilliant, is not so rich in the lavender and extra violet rays of the spectrum as pure magnesium, so is not so well fitted for photographic operation, or other purposes where actinic rays are necessary. An alloy of fifty per cent of thallium and magnesium burns very steadily and slowly, but the magnesium flame is so brilliant that it completely masks the green flame of the thallium. Mr. Mellor has also recently discovered that a small proportion of thallium added to magnesium makes it very tough and pliable—a quality of some value, considering the ribbon and wire of unalloyed magnesium are so brittle.

Magnesium has recently been applied with the greatest success in pyrotechny. The powdered metal when covered with paraffine, is preserved from the action of acids and alkalies, and can safely be employed in the manufacture of fireworks. If only from two to five per cent of magnesium be mixed with the ordinary rocket powder the light is greatly intensified; and the effect was seen to great advantage in the recent pyrotechnical displays at the Crystal Palace. In rockets the dense white smoke produced by magnesium is an advantage rather than a loss; for the canopy then seen floating like a net work of snow-white gauze over each burning star, not only adds by its appearance to the beauty of the display, but reflects downward an additional amount of light. The use of the magnesium powder in rockets for signals at sea deserves the investigation of the authorities at Woolwich, as the light is so greatly intensified at so small a cost. The American Government is now seriously considering the desirability of adopting the magnesium light as their signal light for the service, both in lamps and out of them. At the Wimbledon meetings the light was employed with good effect, the magnesium balloons being generally mistaken by the public for meteors.—*British Journal of Photography,*

PETROLEUM FOR STEAMERS.

Calculations of the relative economy of coal and oil as fuel for ocean steamers, should take into account the important item of firemen and coal passers, their wages, weight and quarters, in addition to the difference in weight and space of furnaces and perhaps of boilers. In the recent experiments on board the *Palos*, at the Charlestown Navy Yard, it has been found that with three of her four boilers. and the attendance of three men, fifty per cent. more revolutions of the wheels were obtained than heretofore with coal under all four boilers, with the attendance of twenty men. But the greatest probable difference may be realized from a more perfect utilization of the force contained in the fuel. It is well known that as yet but a small per centage of the theoretical power of fuel has been obtained through steam. Coal heat is mostly applied by radiation. Oil, with proper apparatus, may be brought, in a state of combustion, mainly into direct contact with the boiler surface. How great a difference this may effect in practice, can be determined only by proper experiment. So that the question between coal and oil can not be ciphered out entirely from theoretical data.

In this experiment, petroleum was the oil supplied from two large iron tanks placed on deck, each tank having a glass gage at its side, to indicate the hight of the petroleum, and a vent pipe on the top to permit the escape of vapor. From these tanks the petroleum was conducted by half-inch pipe to the boiler furnaces, dropping into iron retorts, heated by burners placed beneath them, and being instantly vaporized. This vapor, in burning, was mixed with steam—decomposed by passing through pipes partially filled with iron filings, and with air forced in by a common air pump. The heat thus generated was intense; and the combustion so perfect that no smoke was perceptible. A diminution of the supply of air or steam at once created a smoke.

Commodore Rodgers, commandant at the yard, is so well satisfied with the three days' experiment, that he has determined to apply to the department at Washington for permission to make a trial trip at sea with the *Palos*.

Metropolitan Transit.

The New York city Three-Tier Railroad, having failed of a special charter, is to be built if possible under the general railroad law. The company, it is understood, have drawn up their plans and made preparations to apply to the courts to appoint commissioners of appraisal for the property to be taken, where not obtainable by private negotiation. Their proposed line runs from Canal street between Green and Wooster to the north rear of Bleecker street, there curving west to the west rear of Sixth Avenue, which it follows to Central Park, thence following 59th street to Ninth Avenue the line of which is followed to the Harlem river. The hope appears to be that the comparatively unimportant character of most of the buildings on this line, will permit negotiation to be successful. The buildings for the road are to be of four stories and substantially constructed, so that the running of the cars cannot create the least perceptible vibration. Steel rails will be used, and, by the use of a peculiar chair avoiding joints it has been demonstrated that a loaded car twenty miles an hour, will not make as much noise and jar as an ordinary omnibus. The cars, seating passengers, will be entirely of iron, propelled by compressed air, carried in reservoirs under the cars.

ELECTRICAL EFFECTS ON METALS.—Edlund has recently (1866) shown that the passage of a current through a wire, produces an expansion independent of that of heat. Ruhmkorff states that a bar of soft iron acquires hardness during contact with one of the poles of an artificial magnet.

EXPOSITION NOTES.

SEWING MACHINES.—In the English department there is nothing of novelty.—Among the French machines is one having an overstitch arrangement for the glove manufacture. It is a nearly exact imitation of the action of hand sewing, even to the tightening of the thread by a lever acting like the seamstress' little finger. The needle is threaded with the conventional needle-full, is placed in a needle holder which pushes it through the material, is grasped on the under side by another holder which pulls it through while the first lets go, and then returns it to the upper holder, passing it outside the material. Back-stitching might be effected in this way as perfectly as by hand, using a needle pointed at both ends, with the eye in the middle.—A crotchet embroidering machine is exhibited, in which the usual crochet chain-stitch is applied to pattern by means of a needle actuating a universal feed motion in all directions at the pleasure of the operator.—The American button hole machines and attachments are prominent objects of attention in this line.—Arrangements for a light motive power, by means of a head of water from the upper story, or otherwise and of electricity, are on exhibition. A very simple electrical motion is shown, consisting of a wheel on the driving shaft, with several projections on its edge and a deep groove in its center: in this groove is wound a coil, and on the shaft is placed a commutator, so that on revolving the several projections of the wheel are converted into electro-magnets. Revolving within a framework furnished with projecting plates of soft iron, the electro-magnets are attracted by the plates in succession, and motion is maintained. A Bunsen's battery of four elements, supplies the power.

CREUSOT PHILANTHROPHY.—Among Messrs. Schneider & Co's 10,000 workmen, 500 have within the last six years become proprietors of the comfortable model cottages erected by the firm. They form altogether quite a large town, of not less than 23,000 inhabitants, whose natural increase proves by statistics to be four times the average of France in general, the mortality of children being remarkably small. There is no poverty from sickness, accident or death, for the unfortunate are amply provided for by the provident fund to which all able to work pay 2½ per cent of their wages. The fund amounts now to $60,000, and there are also $50,000 of the workmen's wages in the savings bank. There is no magistrate, no lawyer, and no policeman in the community, and the number of crimes is less than the average proportion of the country at large.

BRONZED IRON from the Tucker manufacturing Company of Boston, attracts much notice from foreigners. It is prepared by oiling the surface very thinly, and then heating it in a stove at the temperature which ordinarily imparts a blue tint, so as just to decompose without charring the oil, at the same moment with the blue oxidation referred to. The oxide takes a brown color and a tenacious solidity from embodying the resinous element of the oil. The surface thus formed has the lustrous metallic appearance of bronze and great durability, and seems to be reproduced under the influence of the atmosphere, if correctly represented, in spots where it is worn away by attrition. The manufacture is to be introduced in France.

AN ENORMOUS BALLOON confined by a cable which unwinds from a drum, is to make hourly ascensions from the middle of the Exhibition, carrying up twenty or twenty.five persons to a hight of three or four hundred feet. It is to be supplied with hydrogen from the decomposition of water by red hot charcoal, at a cost not over $2,75 per 1,000 feet. The balloon is reported to be a perfect sphere of a diameter of 21 meters (nearly 70 feet!) composed of two very fine and close tissues cemented together with several coats of caoutchouc varnish and covered with linseed oil. It is calculated that the vast ascensional power will resist material deflection by the wind. The author of the scheme is Mr. Henry Giffard, the inventor of the injector.

A NEW GAS ENGINE, exhibited by Otto and Langen, has some interesting and possibly valuable peculiarities. The piston is shot upward through the length of the cylinder by the explosion at its foot, but does no work at this stroke, moving freely. The elastic pressure of the air against the vacuum thus formed, stops the piston gracefully, and sends it back with the whole force of the atmosphere pressure, added to the weight of the piston; this time gearing into a pinion and doing good service. The necessity of electricity or double lighting contrivances, together with the excessive heating of the cylinder by explosions at both ends, are obviated by this arrangement.

A WATER PURIFIER by Durenne, to remove carbonate of lime, consists of a tall, rectangular compartment or closet, furnished with a series of trays in the manner of shelves, from each of which, beginning at the top, the water is allowed to overflow in a thin film, falling upon the next below, the whole being constantly exposed to the action of waste steam from the engine. The heat volatilizes the carbonic acid and precipitates the lime in the trays, from which it is removed in solid slabs.

ANOTHER ICE MACHINE, produced by Carre, the maker of the ammonia freezer, produces cold by accelerating the evaporation of water in the presence of sulphuric acid in a vacuum, absorbing the heat of the water into vapor so rapidly that ice is formed in three or four minutes after the air pump begins to work.

A SAFETY SWITCH from London interlocks the levers which act upon the several switches and signals in such a manner that no one can be moved unless the others are in the position they should be in while that particular change takes place.

TANNING.—The report of the Committee on this department contains the somewhat unexpected conclusion that "with reference to the various processes claiming merits in their rapidity of tanning, no definite advantage has yet been found, and the period required remains about the same as before."

A DOUBLE CYLINDER, copperplate, printing machine, printing both sides of a continuous sheet in succession, is in operation on school copy books. The cylinders revolve in a trough of ink, which is scraped off for the impression of a "doctor." A Liverpool printing firm have purchased the English patent and introduced the machine there.

DENMARK exhibits ancient breech-loading cannon used 400 years ago, almost of the exact pattern of Krupp's—but probably not quite as good. Also revolvers of old time, not quite equal to Colts, but on the same general principle.

RUSSIA exhibits samples of manufactured cottons and woollens, and even silk goods from the borders of the Caspian Sea.

THE ENDLESS BAND SAW is applied to sawing boards and timber, with great economy of power and time.

WOODS (AMERICAN) MOWING MACHINE has won the first prize Gold Medal.

A SAFETY SWITCH has been tested and adopted on the Philadelphia & Reading Railroad, which bridges across the main rail without interrupting its continuity, and can operate to conduct a car from the main track only while pressed into its position by the switchman. A guide rail laid close inside the track, on the side toward the turn-out, is the only modification of the main track required. The outside switch rail is some four feet longer than the inside, and is slightly arched, so that when it is brought up snug against and level with the track rail, (the wheel being also pressed close to that side by the guide rail above mentioned) the tread of the wheel will cover it and ascend upon it. On reaching the hight of the arch, the wheel will be raised enough to clear the main track rail and pass over upon the turn-out rail. At the same time, the inside switch rail, which is pointed, and pressed into contact with the opposite main rail, receives the tread of the other wheel and guides it in a parallel course with the first. At the point where the inside switch rail in its turn must cross the main rail, another arch bridges over the main rail with a joint opening, and closing at the crossing point, unless the ordinary frog is there employed.

BREAD ASSOCIATIONS.—In no article is there more room for improvement and increased economy than in bread. As purchased from bakers or as made in kitchens, it is generally both poor and extravagantly expensive. In fifty families there may be one good bread, cake, and pie maker at command; and that one, with a single oven, could supply the fifty families much better and more cheaply than they can bake for themselves. A number of French families have demonstrated this by uniting in a co-operative society under the name of "L'Association des Consommateurs" (The Consumers' Association). They get their bread, of first-rate quality, at eight cents a pound: a reduction of full twenty per cent. from current prices.

CIGARS AT THE SEA SHORE—Every cigar maker knows the difficulty of keeping cigars dry on shipboard and of preserving the aroma of an ever-so-fine Havanna, on the sea coast. Travelers and sojourners at the sea shore who have been at their wit's end to devise a means to protect their cigars from the influence of salt air, will find a simple remedy in the use of a common glass fruit jar fitted with an air-tight metallic or glass stopper

Recent American and Foreign Patents.

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

EVAPORATOR.—Samuel M. Williams, Pine Village, Ind.—This invention has for its object to furnish an improved evaporator so constructed and arranged that the fire may be directed under either of the pans at pleasure, or may be shut off from either or all of the pans as may be desired.

WASHING MACHINE.—E. F. Wheeler, Sag Harbor, New York.—This invention has for its object to furnish an improved washing machine so constructed and arranged as to wash the clothes quickly and thoroughly and with a slight outlay of power.

ROAD SCRAPER.—N. Evinger, San Forl, Ind.—This invention has for its object to furnish an improved road scraper so constructed and arranged that it may be attached to and used in connection with an ordinary plow.

EVAPORATING PAN.—S. P. Dyer, Prairie Depot, Ohio.—This invention has for its object to furnish an improved evaporating pan for making sirup or sugar from cane juice sorghum juice, etc., and for making cider jelly so constructed and arranged that the various operations of evaporating skimming and finishing may be conveniently carried on at the same time.

FENCE.—E. C. Roberts, Salem, Mich.—This invention has for its object to furnish an improved straight rail fence so constructed that the rails and stakes will bind each other firmly securing the fence against wind or animals.

SLEIGH BRAKE.—William Sloan, Highland, Iowa—This invention is designed to furnish a neat, simple and convenient brake for attachment to sleighs.

NEW AND USEFUL ATTACHMENT FOR LANTERN LAMPS.—Jacob Silvius and Wm. T. Haine Sunbury, Pa.—This invention relates to certain new and useful attachments for the lamps of lanterns, whereby the wicks of the former may be adjusted, raised and lowered, and the wicks also deprived of any crust which may be upon them without removing the lamps from the lanterns. This invention therefore, it will be seen, admits of the wick of a lantern lamp being adjusted at any time, even out of doors in a strong wind without the least danger of having the light extinguished.

NEW AND IMPROVED METALLIC CLASP OR TIE FOR BAGS.—D. B. Baker, Rollersville, Ohio.—This invention is designed to supersede the cords, strings, and thongs now employed for tying bags. The invention consists of a metallic clasp composed of two semi-circular parts connected at one end by a link and secured around the bag by a hook on the opposite end of one part fitting in one half of a series of holes in the other part.

MACHINE FOR TEMPERING WIRE.—P. L. Slayton, New York City.—This invention relates to a new and improved machine for tempering wire, and is more especially designed for tempering wire braces for umbrellas and parasoles and straightening the same during the process of tempering.

BALING PRESS.—J. C. Duvall, Sardis, Miss.—This invention relates to a new and improved baling press of that class designed more especially for farmers' and planters' use, for pressing and baling cotton, hay, hops, etc. etc., and to be operated by horse or mule power.

SUGAR EVAPORATOR.—W. C. Smith, Warrensburgh, Mo.—This invention relates to a new and improved sugar evaporator designed more especially for evaporating the sirup of northern canes and to admit of the work being done in a perfect manner by persons of ordinary ability.

BUTTON FASTENING.—J. R. Spooner, Lowell, Ohio.—The object of my invention is to construct a fastening by means of which to attach buttons to clothes without sewing them to the clothes, and in such a manner that, while the button cannot be torn from the garment by force, it may yet be easily moved at any time for convenience in washing, etc.

DRAINING MACHINE.—A. P. Routt, Liberty Mills, Va.—The object of the present improvement is to provide means whereby a more steady and perfect operation of the plow is effected, and whereby the dirt is cleared away from the edges of the ditch to afford free access of water.

WATCH SAFETY POCKET.—R. M. Fisk, Olney, Ill.—This invention consists of a plate attached to the back band of the pantaloons, or other garment, with a hook protruding through a button hole into the pocket; upon this hook the watch is hung and secured thereon by a prong operated by a spring lever pivoted to the plate.

COMBINED PLANTER, CULTIVATOR AND ROLLER.—D. Duncan and E. R. Ridgeley, Olney, Ill.—The object of my invention is to construct a machine which shall be capable of being used as a planter, a cultivator, or a roller, or all together, and which while it is convenient to manage in the field, shall be strong and durable.

MEAT CUTTER.—D. S. Early, Hummelstown, Pa. Patent dated June 11, 1867.—The meat block is rotated on a vertical axis by the impulse of a pinion on the axis of the master wheel, the latter drives a pinion on the shaft provided with cams which lift the knives consecutively and release them to fall by their weight and the force of the spring upon the cutter block.

RICE CULTIVATOR.—G. W. Cooper, Ogeechee, Ga. Patent dated June 11, 1867.—In this invention three objects are attained; first the width of the plow is adjustable; second the manner of fastening the teeth impairs the strength of the beam less than in ordinary plows; third the shape of the teeth renders them less liable to break than are those of the common plow or cultivator.

BREECH LOADING FIRE ARMS.—Robert Errett Stephens, Owen Sound Canada. Patent dated June 11, 1867.—The invention consists of constructing a breech-loading fire arm which by the action of cocking throws open the breech and dislodges the shell of the exploded cartridge simultaneously.

COMBINED SEEDER AND FERTILIZER.—Ansell P. Routt, Liberty Mills, Va. Patent dated June 11, 1867.—The object of this invention is to construct a machine which will drop the fertilizing substance and the seed in the hill together in the proper manner, and which will be simple, cheap easily worked and not liable to get out of repair.

WEATHERSTRIP.—J. B. Wardwell, Georgetown, D. C. Patent dated June 11, 1867.—This strip is formed of a plate of india-rubber and with the springs bearing upon its upper surface is attached to a horizontal rotating shaft moved by the closing of the door, a stud on the door casing impinging upon a lug on the shaft.

BRICK PRESS.—Christopher Becker, Flint, Mich.—This invention relates to a machine in which two molds are alternately used for forming and pressing brick by hand-power, and consists in making three sides of each mold movable.

BUTTON HOLE CUTTER.—Hermann Hempel, New York City.—This invention relates to a new device for cutting button holes of different lengths, the improvement consists in having a sliding rest, which is adjusted under the knife, so as to make the same cut longer or shorter holes, and also in making the knife in one piece, whereby it cannot only be made cheaper, but also easier fastened in the jaw or arm to which it is secured.

BUTTON AND STUD FASTENER.—J. K. Underhill, Brooklyn, N. Y.—This invention relates to a device by which buttons, studs and other similar articles can be secured to garments, and consists in the use of two bent arms, of which one end is pivoted to the body of the button or stud while the end of the other is hinged in the center of the former arm. The first arm is made of a solid piece of metal while the second is a slotted plate, the outer end of the former passing through the slot in the latter.

FEATHER DRESSING MACHINE.—Alvah Washburn and J. N. Van Sickle, Medina, Ohio.—Patent dated June 11, 1867.—In this machine the feathers are treated with steam in a horizontal axis. The steam issues in jets into the feathers until they are sufficiently wetted, when it is shut off from the feather chamber, the ventilators are opened and the feathers are dried by the heat of the steam pipes. The novelty of the invention consists in the arrangements for the induction of steam and the eduction of the condensation from the steam pipes.

CULTIVATOR.—A. P. Routt, Liberty Mills, Va.—This invention relates to a cultivator having two strong iron beams, the rear extremities of which are bent downward so as to form curved shanks or sheaths to which the shares either of the shovel or plow kind, are attached by means of loops and keys and which are made to more securely retain the shovels or plows in any position in which they may be adjusted by having their extremities pointed and bent so as to enter small holes or notches which are formed in the back of each plow or shovel as hereinbefore explained.

WRENCH.—G. B. Keeler, Portchester, N. Y.—This wrench consists of a straight shank or bar, provided with a suitable handle at one end and a series of notches at the other, in combination with an adjustable spring hook, so hung to the said bar as to enable pipes of varying sizes to be grasped.

KEEL BLOCK.—Joseph T. Parlour, Brooklyn, N. Y.—This keel block is so constructed that without necessarily descending into the dock, or pumping the water therefrom, the several blocks, whether one or more, can be adjusted to the proper hights to accommodate the draft of the vessel whether large or small.

LINIMENT.—Madame Rachel Newcomb, South Brooklyn, N. Y.—This liniment is intended as a remedy for rheumatism and pains, as well as bruises and sprains of all descriptions.

WELL TUBES.—J. F. Craig, Eddyville, Iowa.—This invention consists in the attachment to the perforated sides of the well tube of a wire screen or gauze to prevent sand, dirt, etc., from entering the well tube through the perforations, and thus from being drawn up through the tube to the pump.

MANUFACTURE OF COUPLINGS FOR SHAFTS, ETC.—Leander Burns, Portchester, N. Y.—This invention consists in forming the couplings by striking or swaging them from a blank made of one solid piece of metal in a series of dies of proper form, to impart to the blank the shape of an ordinary shaft coupling.

NAPKIN HOLDER.—W. L. Dewey, Bridgeport, Conn.—This holder is extremely novel and most desirable for use, it being constructed with a ring or other suitable form for holding the napkin, and a base or pedestal to hold such ring above and away from the table.

MEDICAL COMPOUND.—H. G. Pope and H. F. Herrick, New Berlin, N. Y.—This compound is for the cure and removal of spavin and other similar complaints in horses.

GOVERNOR.—J. W. Shirley and William H. Fasig, Terre Haute, Ind.—This invention consists in imparting to a horizontal shaft a lateral motion by means of the resistance of the air upon the wings of a wind wheel.

COTTON GIN.—Jules Alfred Chaufourier, Paris, France.—This invention relates a to machine in which the cotton is fed to the rollers by the action of the machine itself, thus dispensing with the manual feed that was heretofore used for the purpose.

ROTARY DOUGH DRESSER.—C. H. Cross, Montpelier, Vt.—The object of this invention is to perform what is technically called by cracker bakers "dressing the dough," or brushing off the flour from the surface of the sheet of dough after it comes from the rollers on its way to the stamping machine to be cut up into crackers.

MANUFACTURING STARCH.—J. J. Gilbert, Little Falls, N. Y.—This invention relates to a new and improved method of manufacturing starch, and to the particular manner in which the grain from which the starch is made is manipulated and operated upon during the process.

VELOCIPEDE SLED.—John Bannihr, Hempstead, N. Y.—The nature of this invention consists in connecting a hand-power mechanism with a sled for propelling it on ice as a velocipede, the movement being effected by levers worked by the person sitting in the sled, which operate on sharp-toed feet, placed in the side wheels, which catch in the ice to propel it forward.

COMBINATION SQUARE.—D. A. B. Bailey, St. Johnsbury, Vt.—This invention consists in attaching to the ordinary steel square a triangular-shaped frame made to slide upon the square, and to which is attached by a hinge at one end an adjustable face for the square, in such a manner that it is made to rest upon the square at any desired angle.

CHECKING THE DRAFT OF FURNACES.—J. C. Bagnall, St. Louis, Mo.—This invention consists in admitting atmospheric air into the stack or chimney of puddling or reverberatory furnaces used in treating metalliferous ores by means of a door made in the stack or chimney above the reverberatory line of the furnace, in such a manner that the heat in the furnace can be regulated with the greatest accuracy, the inside brick work of the stack or chimney is saved, and the damper with its connection, generally used to regulate the draft, can be dispensed with.

POTATO PLANTER.—John P. Scudder, Lawrenceville, N. J.—This invention relates to a machine by which potatoes can be planted in furrows at suitable intervals, the machine being so arranged and constructed that the plow for making the furrow can be instantly raised out of the ground, and that the discharge of the potatoes can be instantly stopped whenever desired, for turning corners and other purposes.

COMBINED DIVAN AND BED.—Henry Buehler, New York City.—This invention consists in so constructing a divan or sofa that it can be opened or adjusted in its various parts to be used as a bed.

PRESERVING TIMBER.—H. L. Houghton, Morrison, Ill.—This invention consists in forming a composition (hereinafter described) by which I am enabled to render the softest and most worthless wood suitable for almost any purpose.

DISH.—E. L. Bolster, Waterbury, Conn.—This invention relates to a dish for holding stove polish, and the invention consists in combining with the dish a knife or blade so secured thereto that in drawing the cake of stove blacking across its cutting edge the blacking as it is cut will fall into the dish, from which it can be used in the ordinary manner. This dish is most convenient and desirable for housekeepers.

MONKEY WRENCH.—Dennis A. Kellogg, Valparaiso, Ind.—This invention relates to an improved plan of constructing a wrench for screw taps.

NIPPERS OR WIRE CUTTING PINCERS.—Peter Broadbooks, Batavia, N. Y.—This invention consists in an improved construction in cutting pincers, especially adapted to cutting wire.

STOP MOTION AND REGULATOR.—Charles S. Westland, Providence, R. I.—This invention relates to a method of stopping or slackening the motion of a pumping engine when from any cause the pressure has been suddenly removed.

JIGGING MACHINE.—William W. Spalding, Greenland, Mich.—This invention relates to improvements in jigging machines, and consists in novel arrangements and devices for washing the ores of copper, lead, silver, and other metals after they have been pulverized in a stamp mill, and separating the minerals or metals from the rock and earthy substances associated with them in the ore.

GRAIN ELEVATOR OR LIFTER.—William Marcus Jackson, Yolo, Cal.—This invention relates to a new and improved attachment to be applied to reapers for the purpose of elevating lodged grain and bringing it within the reach of the reel so that the latter can present it properly to the sickle.

COMPASS AND CAULKING SEAM GAGE.—Geo. Dowling, Hartford, Conn.—This invention refers to an implement which is intended to facilitate the operation of determining the width of a caulking seam throughout the whole length of a ship and which enables a ship's carpenter to make accurate work without being compelled to have recourse to his rule at short intervals or to trust to his eyes.

EXTENSION HORSE.—R. Hammill, Mineral Point, Wis.—This invention relates to a horse or trestle which is used by masons, plasterers and others for supporting scaffolds, etc., and it consists in so constructing the same that it can be raised or lowered, lengthened or shortened, and folded together as may be desired so that it will be adaptable for all purposes, and can be extended to the very largest dimensions.

COMBINED SAWING AND MORTISING.—Henry Hassenpflug, Huntington Pa.—This invention relates to a machine on which a circular saw, a reciprocating saw and a chisel can be arranged in such a manner that all work which can be performed on the said instruments can be done on the machine by hand or other power. The invention consists in the mode of applying and regulating the power by which the machine is driven so that the latter may be used for light and heavy work as may be desired. The invention also consists in an automatic feed motion, in the manner of securing and adjusting the bed for mortising, and finally in the device for holding the reciprocating saw wherein the chisel for mortising may also be secured.

PUMP.—Hiram Parks, Athens, N. Y.—This invention relates to the apparatus for operating pumps, which is such, that a pump can be worked at a distance of half a mile or more, when desired.

PLOW.—Frederick Volkmann, Hoboken, N. J.—This invention consists in securing the lower end of the upright screw shaft, to which the front end of the plow beam is secured, in the axle of the plow-ears, so that the upper frame and sliding-block, for sustaining the upper part of the said screw-shaft, may be dispensed with. It consists also in making the axle of one solid piece, and bending the draft bar, so that it will pass under the axle and not through the same. Also in making the attachment of the draft-chain to the plow-beam laterally adjustable, so that it can be regulated in conformity with the wearing of the plow-share.

COAL OIL-LAMP CHIMNEY.—John Belleryeau, Philadelphia, Pa.—This invention consists in so arranging a metal tube and securing it to the burner by means of narrow, metal strips, that a glass chimney may be placed over and around the narrow strips, so that the light will shine through the glass, while the destructive effects will be exerted on the metal and not on the glass.

BUTTON.—Joseph M. Prugger, New York City.—The object of this invention is to construct a button with its fastening secured to it in such a manner that the button may be easily applied to or detached from the cloth at will, and may be firmly held thereon.

CEMENT.—Patrick Kennedy, New York City.—This invention relates to a new composition for making a cement which is to be particularly adapted for securing door-knobs to the spindles, but which may also be used for other purposes.

SLEIGH BELLS.—W. H. Nichols, East Hampton, Conn.—This invention relates to a new manner of attaching the wire or pin, by which sleigh bells are secured to leather straps, and consists in at once casting the wires or pins in the bells; that is to say, the complete wire or pin is inserted into the mould and the bell is then cast around the same, so that the said wires or pins will afterward be securely held.

DEVICE FOR CLEANING THE TRAPS OF WATER-CLOSETS.—James Wright, New York City.—This invention relates to a device for cleaning the curved or S-shaped pipe or traps of water-closets, and consists in the use of a flexible rod which is inserted in the end of the pipe, and can accommodate itself to the shapes of the tube so as to completely clean the same.

EXTENSION NOTICES.

Bernard Hughes, of Rochester, N. Y., having petitioned for the extension of a patent granted to him the 16th day of May, 1854, for an improvement in trip hammers, for seven years from the expiration of said patent, which takes place on the 16th day of May, 1867, it is ordered that the said petition be heard at the Patent Office on Monday, the 30th day of September next.

Stephen Morse, of Springfield, Mass., having petitioned for the extension of a patent granted to him on the 6th day of September, 1853, for an improvement in iron car brakes, for seven years from the expiration of said patent, which takes place on the 6th day of September, 1867, it is ordered that the said petition be heard at the Patent Office on Monday, the 19th day of August next.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisements at 50 cents a line, under the head of "Business and Personal."

J. A. C., of Ga., says: Your rule for finding horse-power as given in your issue of June 1st, page 347, in reply to G. B. of Mass., says: "Multiply the area of piston by pressure of pounds per square inch and the product by number of feet traveled by piston per minute." Does it mean boiler pressure as indicated by steam gage, and if so does not the horse-power depend entirely on the pressure in the boiler? Is 33,000 always taken as the unit for horse-power? We reply, that the assumption is that the pressure on the piston is about boiler pressure. Probably this is never really so, and in many cases, owing to the distance of engine from boiler and the sinuousity of connecting pipes, etc., the engine pressure is very much less than the boiler pressure. Horse-power of an engine does *not* depend entirely upon boiler pressure. There are other important elements to be considered. This mode of calculating horse-power is never relied upon as absolutely correct; it is only an approximation to the truth. The indicator is the only sufficient test, so far as we know. 33,000 is generally received as the unit of horse-power, although 28,000 and 30,000 have been claimed as nearer the truth.

J. M., of N. Y.—We know of no rule applicable to all cases to determine the amount of horse-power developed or transmitted by shafting. The power of belts comprises so many elements that a calculation is exceedingly difficult; strength, position, and mode of running belts vary so greatly as to prevent the establishment of any general rule. The use of a dynamometer, of which there are several in the market, would probably give you a satisfactory result.

J. B., of N. Y.—If we understand your combination of belts and pulleys we not see any new arrangement. You merely gain power by the additional adhesion of the combined belts.

R. F. L., of Miss., wishes to drive a muley saw by friction. The driving pulley is 12 feet diam. with an 18-inch face of wood and the pulley on the saw shaft is 30 inch diameter and 18-inch face of iron. The two are too near for a belt unless a counter shaft is put up. From the data furnished we should suppose that sufficient friction might be generated to operate the saw. It might be tried and if not successful the counter shaft could then be hung.

J. S., of Mich.—It could hardly be supposed that railway car wheels would run long with any accuracy if they turned on their axles like those of an ordinary vehicle. A very little thought and observation will convince you of its impracticability as well as a column of explanation.

E. A. B., of R. I.—"Foot pounds" is a term used to denote force, and means simply the energy exerted by a falling weight. One foot is the force of one pound falling one foot in one minute or the power required to raise one pound one foot high in one minute. The unit of horse power, 33,000 pounds, raised one foot high in one minute, is 33,000 foot pounds.

J. H. B., of N. Y.—Homer cannot be accused of nodding in the paragraph you refer to, as a careful reading will show our assertion distinctly to be, that much less water will flow through four 1-inch pipes, than through one 4-inch pipe.

Business and Personal.

The charge for insertion under this head is 50 cents a line.

Cotton Factory Wanted at Coloma, Ill. See advertisement and address A. P. Smith, Sterling, Ill.

Mr. Lane, Patentee of the Sett Works for Saw-mill Carriage will please send his address to A. G. Dabney & Son, Lynchburg, Va.

Makers of Washboards—arrange with A. Packham, Prestonsville, Carroll county, Ky., to manufacture his $1 washing machine.

Petroleum as Fuel Successful at Last—Highly Important—See notice of patentee in advertising columns.

C. W. Hunt wants Wood-working Machinery and Steam Engine—See advertisement.

NEW PUBLICATIONS.

THE MECHANISM AND CONSTRUCTOR FOR ENGINEERS, by Cameron Knight. Part V has just been received; also, BOURNE'S TREATISE ON THE SCREW PROPELLER, Part XX, for May.

We have before given warm commendation of both these publications. The former is a valuable assistant to the forger and machinist as well as to the Engineer, and the latter interesting to builders of marine engines.

D. Van Nostrand, corner Broadway and John Street, this city, is the Agent.

THE MODERN CARPENTER AND BUILDER. NEW AND ORIGINAL METHODS FOR EVERY CUT IN CARPENTRY, JOINERY, AND HAND-RAILING, by Robert Riddle, Author of "Elements of Hand-Railing." D. Appleton & Co., 443 Broadway, New York.

This treatise is a large quarto, the letter press clear and distinct, illustrated by fourteen plates. The explanations are full and easily comprehended, and the diagrams plain. Practical workmen will find no difficulty in following the author's instructions.

TABLES FOR QUALITATIVE CHEMICAL ANALYSIS, by Prof. Heinrich Will, of Giessen, Germany. Seventh Edition. Translated by Charles F. Himes, Ph. V., Professor of Natural Science, Dickinson College, Carlisle, Pa. Published by Henry Carey Baird, Industrial Publisher, 406 Walnut Street, Philadelphia.

These Tables (there are eleven of them) exhibit in a compact form the tests and reactions of a large number of chemical substances. They are very useful for students and amateurs.

Inventions Patented in England by Americans.

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

PROVISIONAL PROTECTION FOR SIX MONTHS.

1,067.—HAMMER.—Geo. Selsor and Wm. Cook, Philadelphia, Pa. April 10 1867.

1,119.—SHOES FOR HORSES AND CATTLE.—Henry F. Shearman, Elizabeth, N. J. April 15, 1867.

1,143.—BREECH-LOADING FIRE-ARM AND CARTRIDGE AND BALL TO BE USED THEREWITH.—Edward Lindner, New York City. April 18, 1867.

1,177.—FEEDER OR HOPPER FOR CENTRIFUGAL SUGAR MACHINES.—Helen Merrill, New York City. April 23, 1867.

1,179.—APPARATUS FOR SPRINKLING OR DIFFUSING LIQUIDS FOR REFINING SUGAR AND OTHER PURPOSES.—Helen Merrill, New York City. April 23, 1867.

1,181.—BLOWING AND PUMPING ENGINE.—Philander H. Roots, Cornersville Ind. April 23, 1867.

1,203.—STEAM ENGINE.—Fred. W. Gordon, Cincinnati, O. April 25, 1867.

1,211.—LIFE BOAT.—Albert L. Shears, Flint, and Wm. S. Driggs, East Saginaw, Mich. April 26, 1867.

1,215.—MACHINERY FOR BURRING WOOL, GINNING COTTON, ETC.—Robert J. Clay, James T. Husted, Ebenezer G. Buring, and Cornelius Corson, New York City. April 26, 1867.

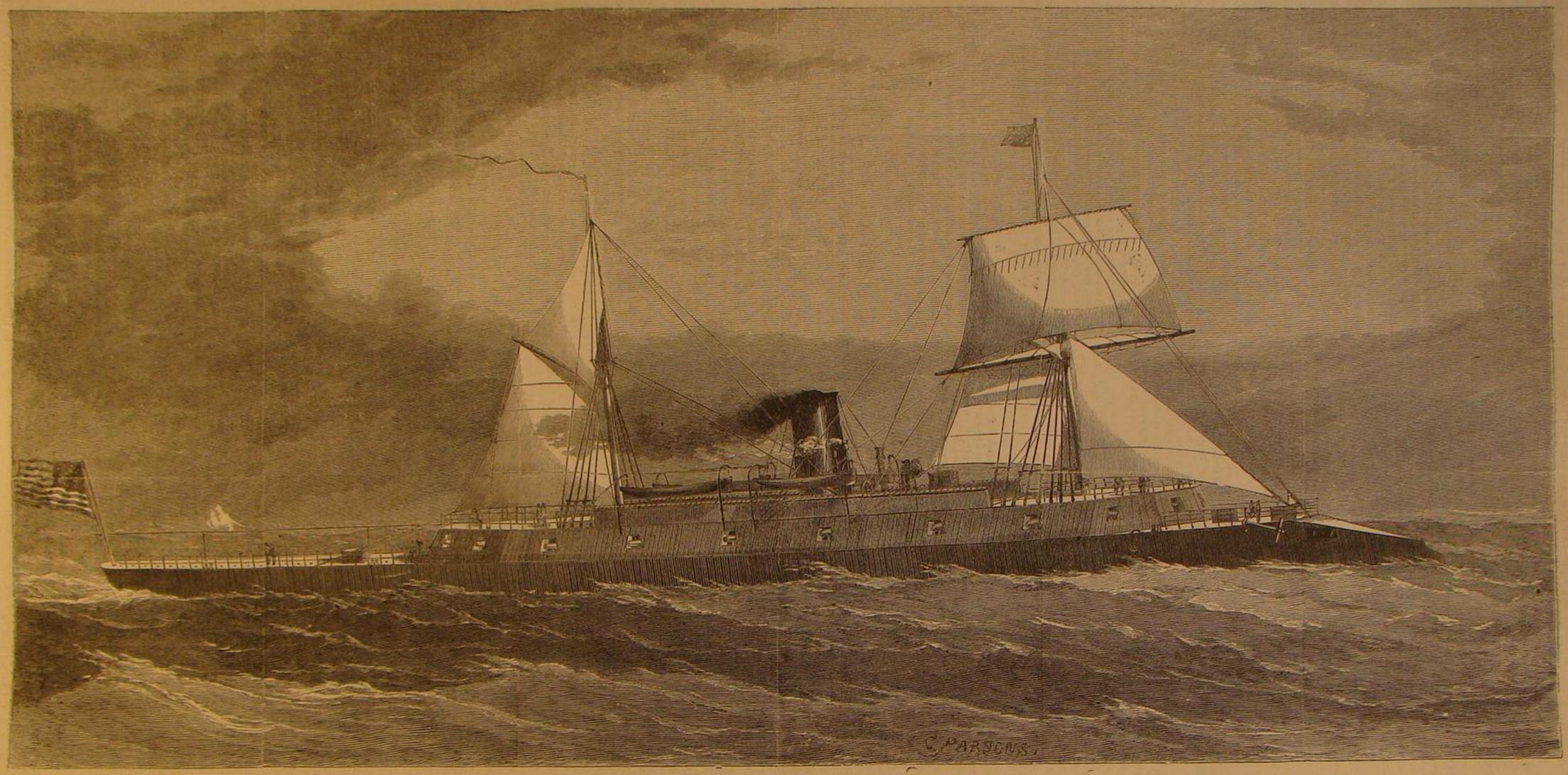
1,234.—PACKING FOR STUFFING BOXES.—Ivon B. Miller, Philadelphia, Pa. April 29, 1867.

1,236.—BOBBIN.—Frederick W. Northrop, New Haven, and Ezra S. Munson North Haven, Conn. April 29, 1867.

1,250.—COMBINED TAPER HOLDER AND MATCH BOX.—John A. Whipple, Boston, Mass. April 30, 1867.

1,262.—INSTRUMENT FOR INDICATING ATMOSPHERIC CHANGES AND THE FORCE OF STORMS.—Henry A. Clum, Rochester, N. Y. May 1, 1867.

1,266.—BOOTS AND SHOES.—Albert Van Wagenen, Boston, Mass. May 1, 1867.



THE STEAM RAM AND FLOATING BATTERY DUNDERBERG, RECENTLY SOLD TO THE FRENCH GOVERNMENT.

THE DUNDERBERG.

The new proprietors of this magnificent ship—of which we present herewith a handsome engraving—were treated on the 13th to an exhibition of her steaming qualities, after a full overhauling of her machinery. She was tried four times on the measured nautical mile (6,085 feet) twice with and twice against the tide, making the four miles in 18 min., 32 sec.—an average of one mile in 4 min., 38 sec., or about 13 knots an hour, at an average of perhaps 22 lbs. steam pressure. With 25 lbs. at starting, the screw would make as many as 58 revolutions, but it was impossible to sustain the pressure, as the fires had become fouled by standing open the most of the day while adjusting the machinery. She was put about in 3 minutes, 14 seconds. The guns, which are U. S. property, were forbidden to be fired by order from the Navy Department.

We published a full and accurate description of the *Dunderberg* on page 173 of the present volume, to which our readers will find it interesting to refer in connection with the accompanying pictorial view. The figures therein given differ somewhat from those which have appeared in other publications, but as they have the authority of Erastus W. Smith, A. P. D., the designer of the machinery; Messrs. John Roach & Son, the builders, and Mr. Wm. H. Webb, the constructor and contractor of the ship, they are as near correct as may be.

The *Dunderberg* is a steam ram and also a floating battery. As a cruiser she was never intended. She is specially designed for coast defence—being a movable battery—and as such is not equaled by any craft afloat.

It never was pretended by those who had charge of her construction that she was entirely impregnable to shot, or that she could successfully contend against all land and sea batteries which might be constructed. The intention was the construction of a ship which might be used either as a floating battery, a ram, or, if necessity required, a cruiser, capable of carrying coal sufficient for a voyage, and of affording convenient accommodations to a crew. That these conditions are fulfilled in the *Dunderberg* cannot be successfully disputed. If she is not as fast as some smaller vessels, her great weight makes her very formidable as a ram, especially when the immense strength of her beak and bow are considered. As a battery, no ship that ever floated could carry and work such guns and so many as the *Dunderberg*, and be so little affected by their concussion. As a cruiser probably there are few iron-clads so economical, considering their tunnage, in the use of coal and oil as the *Dunderberg*. She must be considered as a *sui generis*, but as compared with the best specimens of broadside iron-clads, unequaled.

The ship is not entirely an experiment. Heavy guns in broadside ships having armored sides are not unknown nor untried. The *New Ironsides* has tested her strength against shore batteries. The *Dunderberg*, while not professing to take the place of the monitors, is a powerful ship, well armored, solidly built, molded according to the strictest rules of the ship-building art, and calculated as well for the shock of the seas as the opposition of hostile batteries.

Possibly in surrendering this floating battery and ram to a foreign government we may have done a foolish thing, but as the principle of our republican government is peace, and our war resources are almost unlimited, it would not, even under the circumstances of war, seem folly to part with one of our experiments, if we had already studied its construction and noted its defects. That the *Dunderberg* is an experiment, and an untried one, cannot be denied; but that she combines the principles of large offensive qualities with proportionally small exposure of vulnerable points is susceptible of proof.

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☞ Messrs. Trubner & Co., 60 Paternoster Row London, are also Agents or the SCIENTIFIC AMERICAN.

VOL. XVI., No. 26....[NEW SERIES.]....*Twenty-first Year.*

NEW YORK, SATURDAY, JUNE 29, 1867.

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NOTICE TO SUBSCRIBERS.

To save several pages of room, which the pictorial title page and index we usually print in the last number of each volume would occupy, we shall print at this time an edition of an illustrated frontispiece and index separately.

Those who wish to preserve the work can be supplied gratituously with this sheet to bind with their volume on application to this office either in person or by mail, or through any dealers who supply the paper.

MODELS AND MONEY BY EXPRESS.

Parties should never inclose money in the box with their models. Express companies are not liable for the loss of money thus sent. It should be forwarded in a separate parcel and a separate receipt taken. It is safer to inclose currency in a letter by mail than to place it inside the box. The name and residence of the inventor should be attached to every model; and in sending money by express, a note should accompany it stating who it is from and the purpose for which it is sent. The name of the sender should also be written on the outside of the envelope. The best ways to make remittances by mail are by draft on New York, payable to order of Munn & Co., or by postal order; or currency by Express in an envelope separate from the model.

An owner is wanted for a draft for $16 from Baraboo, Stark county, Wis.; and for $32 currency from Oconomowock, Waukesha county, Wis. The senders of these amounts will please write to this office and inform us the object of their remittance.

THE SCIENTIFIC AMERICAN---A NEW VOLUME.

This number closes Vol. XVI of the SCIENTIFIC AMERICAN. It is probably unnecessary to recapitulate the peculiar features of this journal to our regular readers, but to others, who only occasionally see the paper, we wish to say a few words. Although not in the general sense a *news* paper, and in no sense a partisan paper, the SCIENTIFIC AMERICAN makes a weekly exhibit of the novelties in art and science, notices all useful improvements, new inventions, and discoveries. It aims to encourage honest endeavor and the inventive talent of the country and the world, by generous mention and judicious counsel. At the same time it will not hesitate to expose charlatanism and unwarranted pretention, thus protecting its readers from the imposition of mechanical and scientific quacks.

To the mechanics and scientists of the country, to all seekers after practical knowledge, our columns are always open. Their communications are received, read, and if of general interest, published. We intend to give all a fair hearing and a courteous consideration. If we ever fail in doing so at the time expected, it must be attributed to the limits of our columns and not to intentional neglect.

Our "Answers to Correspondents" are made by two editors both practical men, one in the domain of science and the other in mechanics. This department, alone, is worth much more than the subscription price of the paper. It contains an amount of really valuable information not to be found in volumes of "manuals," "encyclopedias," or other ostensibly scientific and mechanical works.

Our "correspondence" embodies the ideas of progressive men in all parts of the world, giving our readers an opportunity of communicating with each other and the great world on subjects affecting the advancement of science and the race.

The illustrations of new inventions are of inestimable value to the mechanic, the farmer, and the business man. The engravings are not surpassed in accuracy, and quality of artistic execution by any others, and the descriptions, by a thorough mechanic and vigorous writer, are plain and terse.

The weekly list of patents issued is a feature interesting and valuable to all classes. It is furnished officially, expressly for this journal, at an expense of several thousand dollars a year, and may be depended upon for accuracy.

Editorially the SCIENTIFIC AMERICAN will continue to be instructive and interesting. Fearless in the exposure of humbugs, alive to the progressive tendencies of the age, and just to all the improvers of the race, it will as heretofore strive to embody truth with talent and conservatism in principle with progress in practice.

THE PENDULUM IN ITS VARIED APPLICATIONS

The prize which the genius of Galileo gave the world, has proved more of an acquisition than he could have anticipated. The discovery of the isochronous vibrations of the lamp suspended from the Pisa cathedral, was not merely accidental. It was one of the most familiar sights, but the inquiring mind of the choir boy detected what probably no one before him had done, that while the extent of the arcs steadily diminished, the vibrations were completed in the same time. The principle appeared to him important and he caused it to be employed by physicians in counting the pulses of their patients.

Unquestionably the most useful application of the pendulum ever made, and one which early suggested itself, was in the measurement of time. Aside from this other applications of a scientific character have been devised, and an enumeration of some of the more important ones is the purpose of this article.

Dependent upon gravity for its motion, the pendulum has been of use in demonstrating anew the grand law propounded by Galileo, that gravity acts independently of the mass. This verification was made first by Newton who using a hollow sphere as a pendulum ball, filled it successively with feathers, liquids, metals, and ivory, finding that however the substances varied in density, in every case the same time was required to complete the oscillations. As the rapidity of the oscillations increases with the increase of the force that at every swing attracts it downward, by accurately noting the difference in pendulum vibrations at the surface and below it, the measure of the relative intensity of gravitation may be estimated, and consequently the form as well as the density of the earth determined.

Few incidents of scientific interest have ever excited more general interest than the experiment devised by M. Foucault of Paris, in 1851, for demonstrating the rotation of the earth by means of a pendulum and making this rotation visible to the eye of an observer. His mode of procedure was as follows: From the center of the dome of the Pantheon was hung a fine wire 210 feet long, terminated by a heavy ball, the whole swinging freely as a pendulum. Beneath the ball was placed a round table. Now it can be shown by the principles of mechanics, that a pendulum once in motion, will not change the direction of its oscillation, however the point of support may be rotated, so that in this case the diurnal revolution of the earth will not affect the plane of vibration, but the latter will maintain strictly the same direction during the twenty-four hours. In this interval, however, the table, in consequence of this diurnal motion, will continually change its position so as to make a complete revolution around its center. As a consequence it will soon be found that the ball of the pendulum never returns precisely to the same starting point after two successive vibrations, and a line marked by a projecting point of the ball upon the table, will show the earth's rotation. If the experiment were tried at either pole, a complete apparent revolution would be seen every twenty-four hours. At the equator, on the other hand, the plane of vibration is carried forward by the revolution of the earth and so undergoes no change with reference to the meridians. Between these localities the time required to complete the rotation varies with the latitude, being greater as we recede from the poles.

In establishing a universal standard of measures, some natural unit needs to be selected. The space travelled over by light in the ten-millionth part of a second, has been proposed as furnishing this invariable unit; the length of an undulation of a ray of light of some definite refrangibility has also been advanced, but this inappreciable length must be multiplied a million fold to furnish a suitable unit. The linear dimensions of the earth, and the linear measure of its attraction embodied in the pendulum, are the only available sources of invariable and universal standard length, and were acknowledged as such by the members of the French Academy previous to the adoption of their present decimal system. They hesitated for a time which of these to accept, and it is to be regretted that final choice was made of the former, taking the ten-millionth part of the quadrant of a meridian as a metrical unit. This measurement afterward proving incorrect, the whole system is now founded on just what the projectors sought to avoid, viz., an arbitrary unit. As if admitting an unwise decision, the Commissioners, in their report recommending the metrical system, were careful to insert this provision, that in the event of the loss or destruction of all material representatives of the metre its value might be recovered from a specified relation existing between its length and that of the pendulum vibrating seconds at Paris. The English Parliament in 1824 made a similar proviso for restoring the standard yard should it be lost, defaced, or otherwise injured, enacting that in this case a new standard should be constructed bearing the same proportion to a seconds pendulum vibrating seconds of mean time in a vacuum at London and at the level of the sea, as 36 inches bears to 39·1393 inches, the length of the seconds pendulum at London. The failure of the attempt to put in force this enactment in 1834, after the destruction by fire of the Parliament buildings and the standard yard with it, was owing to an inaccuracy in the previous measurement of what was to become the basis of their calculation, viz., the pendulum, and a new standard was finally made from a careful comparison of the most accurate and best authenticated copies of the old standard yard. This failure of course argues nothing against the employment of the pendulum in the capacity of a linear measurer, and it is quite certain that should any system of measures universally accepted by civilized nations, be formed, the pendulum would at once be looked to as furnishing the proper standard, being imperishable, invariable, and capable of identical reproduction.

AN ANSWER TO THREE INQUIRERS.

We have before us three letters of inquiry from three young men asking advice on the same subject. As there may be many more in search of similar information, we propose to reply through our columns instead of by mail, giving briefly what information we may, drawn not from observation alone, but from a somewhat rough personal experience.

W. J. of N. Y. says he is a "poor boy without means and desires to become a mechanical engineer." He wants to know the "proper course to take, and the studies to be pursued."

J. N. of Pa. is an "apprentice in a machine shop; has served two years and has three more to serve." He thinks he "could accomplish a great deal in that time and is determined to do all he can; wants to know what studies to take first; has books on philosophy, arithmetic, geometry, algebra, etc., and desires advice to assist him."

E. A. B. of R. I. has "recently finished his apprenticeship in a machine shop; wishes to learn more;" asks "what studies he shall pursue to become a mechanical engineer, as he has to depend entirely upon himself."

Here we have an untaught boy, an apprentice to the machinist's business, and one just out of his apprenticeship. The three positions probably represent a very large proportion of our young male readers; so what we may advise may be of as much use to others as to the inquirers themselves

First, then, to become a mechanical engineer involves becoming a practical mechanic, a workman. To be this requires a patient apprenticeship to the machinist's business and a constant effort during the time to become master of the tools used and the processes employed. We do not propose to discuss the duties of the apprentice; these are taught in the shop. Obedience to orders, application to work, a determination to do whatever work is given in the right way and well, and an endeavor to understand what he is doing, are among the requisites of the intelligent and progressive apprentice. Now, the intellectual preparation for the business of the mechanical engineer can be made during the apprenticeship and both this and the mechanical dexterity can be improved vastly after the period of novitiate is finished. The evenings of the apprentice and the workman are their own. Let them be used.

A knowledge of arithmetic is indispensable. It must be thorough. The good mechanic ought to be a good arithmetician. By this term we comprehend a knowledge of algebra and some acquaintance with the higher branches of mathematics. Grammar is not to be despised. The engineer must often be required to state in writing, as well as verbally, his reasons for a process or a combination of devices, and to explain his own ideas so that others may comprehend them. It detracts much from the influence of an engineer or a mechanic if he is not able to put his ideas into presentable language.

Natural philosophy is a desirable study. Indeed some departments are absolutely necessary to the mechanic's success. Geometry and the practice of mechanical drawing are essential to the engineer, if he expects to be able to direct and control as well as to obey and perform. Among the books especially intended for the mechanical engineer may be enumerated a number of the manuals or hand books published from time to time, as Scribners, Molesworth's, and others. Then there are Bourne's Hand book of the Steam Engine, Byrne's Practical Metal Worker's Assistant, Bourne's Catechism of the Steam Engine, Burgh's Land and Marine Engines and Boilers, Morin's Mechanics, Bartlett's Mechanics, Williams on Heat and Steam, and many others which may be studied with profit and interest after the requisite knowledge of arithmetic, language, and natural philosophy has been obtained.

After all, however, more depends upon the energy and determination of the apprentice than upon these aids. One may have all these and more and yet from want of pluck and persistence remain forever in a subordinate position.

AN UNDERHUNG RAILROAD CAR has been proposed before the Institution of Engineers in Scotland, with a view to admit the use of larger wheels, and to diminish the lateral action by lowering the center of gravity. Not to speak of the increased weight in proportion to capacity, the intolerable aggravation of the dust nuisance, and the instantaneous and inevitable destruction of any car run off the track, interpose a peremptory veto in advance of any change in this direction.

PRESERVATION OF MILK.—It is stated that dairywomen have discovered, but philosophers have not explained the reason, that milk suddenly cooled after being drawn from the cow will keep much longer than otherwise. The cheap, artificial methods of reducing temperature in three or four minutes to any desired point, may yet find a general and very useful application in milk dairies, although its effect upon the production of butter is questionable.

THE STRAWBERRY exhibition of the American Institute has been postponed one week; that is, until Tuesday and Wednesday evenings, the 25th and 26th instant.



ISSUED FROM THE U. S. PATENT OFFICE
FOR THE WEEK ENDING JUNE 11, 1867.
Reported Officially for the Scientific American

PATENTS ARE GRANTED FOR SEVENTEEN YEARS, the following being a schedule of fees:—

On filing each Caveat.....$10
On filing each application for a Patent, except for a design.....$15
On issuing each original Patent.....$20
On appeal to Commissioner of Patents.....$20
On application for Reissue.....$30
On application for Extension of Patent.....$50
On granting the Extension.....$50
On filing a Disclaimer.....$10
On filing application for Design (three and a half years).....$10
On filing application for Design (seven years).....$15
On filing application for Design (fourteen years).....$30

In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay $300 on application.

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

65,525.—LADDER.—P. M. Ackerman, Webster, N. Y.

First, I claim the combination of the ladders, A and B, the latter being provided with the flat windlass, H, and having the rope, b, arranged as shown and described.

Second, The hook, D, having the weighted tumbler, E, provided with the pin or stop, o, pivoted to it and arranged to strike the rounds of the ladder, and thereby raise the hook and let it pass the round both in ascending and descending, substantially as described.

Third, In combination with the ladders, A and B, and the flat windlass, H, I claim the ratchet, d, and pawl, e, arranged as set forth.

65,526.—FIRE ALARM.—W. W. Andrews, J. Cummer, J. F. Ganweiler and Jost Stengel, Croton, Mich.

First, I claim the employment of cords, B B, when said cords are saturated with some inflammable material for the purpose of more effectually enabling them to be consumed or severed in case of fire, substantially as described.

Second, The employment of rods, C C, in the manner specified for the purpose of indicating the exact room or locality in which the fire originated in combination with levers, G, and weights, F F, substantially as described.

65,527.—BOTTLE PUMP.—George Asmus, Houghton, Mich.

I claim a bottle pump, constructed and arranged substantially as described, as an article of manufacture.

65,528.—MOP AND BRUSH.—A. C. Bacon, Cleveland, Ohio.

First, I claim the frame, B, provided with the head, B' fingers, b, arms, D C, screw, E as and for the purpose substantially as set forth.

Second, The herein described holder, in combination with the brush or mop, substantially as and for the purpose specified.

65,529.—PLOW.—Ephraim Ball, Jr. Canton, Ohio.

First, I claim so conecting a metal plow beam, that the parts that are attached thereto, can be made either of cast iron or steel, or of both, substantially in the manner herein specified.

Second, The combination of a steel mold board, point and land side with cast iron plow beam when said plow beam serves for the purpose of a support to the mold board, point and land side and also for a plow beam, substantially in the manner herein specified.

Third, The brace, K, and bar, O, when used in connection with the plow beam, A, substantially in the manner and for the purpose herein specified.

Fourth, The groove, t, in the plow beam, A, when arranged in the manner and for the purpose herein specified.

Fifth, The dovetail at h, in the top of the groove, s, when used in connections with the projections, n, on the land sides, K and M, substantially in the manner and for the purpose herein specified.

Sixth, The attachment of the cutter, P, to the cast iron plow beam, A, in the grooves, a a, in said beam in the manner herein specified.

Seventh, The L-shaped block, G, in cast iron point, when said point is used as a part of the cast iron attachments in the manner herein specified.

Eighth, The block, H and I, and hooks, L and N, constructed and arranged in the manner herein specified.

65,530.—LUBRICATOR FOR SPINNING MACHINES.—Joseph B. Bancroft, Hopedale, Mass.

I claim the combination and arrangement of the oil chambers, c d, the groove, f, and the hole or holes, e, with the bracket, D, the neck, H' and the gear, E, the whole being substantially as described.

65,531.—SKATE.—E. H. Barney and John Berry, Springfield, Mass.

First, We claim as a new article of manufacture, the pieces, f f, when punched or upset from the foot plate, A, in combination with the clamps, a and a', having beveled edges, b b, all made substantially as herein described and for the purposes set forth.

Second, The pin, e, when attached to the clamp, a, and operating in the groove, e, or against the collar, l, on its outside, when made substantially as herein described, and for the purpose herein set forth.

65,532.—GRADUATED BEVEL SQUARE.—Solomon E. Bickford and Frederick Flanders, Franklin, N. H.

We claim the within described bevel square consisting of the blade, A, with its inner and outer scales, and the blade, B, with its indicators, e, connected by the screw pin, b, and nut, C, or their equivalents, arranged and operating substantially as set forth.

65,533.—MANUFACTURE OF STOPPLE FOR BOTTLES.—Leverett Bishop, Paris, N. Y.

I claim the right to make and use in the fabrication of stopples for bottles, a substance called lignine, or an approximation thereto, also light porous woody fiber, as both herein specified, by means of compression into molds or forms herein mentioned and described.

I claim compression as above only for the specific purpose of securing to such stopples the quality of rapid expansion by moisture and somewhat of cork-like elasticity and for giving them certain definite artistic shapes.

65,534.—APPLE PARING, CORING, AND SLICING MACHINE.—A. McR. Blain, Deerfield, Va.

First, I claim the coring blade, L, shaft, M, clutch pulley, N, and bent spring, P, in combination with the horizontal frame, K, frame work, A, and prong shaft, B, constructed and operating substantially as herein shown and described.

Second, The arrangement of the prong shaft, B, halving knife, H, coring knife, L, and slicing blades, T, with each other and with the frame, A, when all are constructed and operating as herein described and for the purpose specified.

65,535.—BOOT BLACKING.—Alaxandr Boudrou, Philadelphia, Pa.

I claim the compositions composed of the ingredients named, for blacking leather boots and other articles of leather, stoves and other articles of iron, and for coloring polished iron, substantially as described.

65,536.—STEAM ENGINE.—R. Brayton, S. Curtis and David June, Fremont, Ohio.

First, We claim the cam, d, yoke, c, stem, b, and valve, s, as arranged in combination with the chamber, P' valve, l, and pipes, O' and R, for the purpose and in the manner as herein described.

Second, The link, K, rock shaft, J, and link, e', as arranged in combination with the cam, d, yoke, c, stem, b, and valve, s, for the purpose and in the manner set forth.

65,537.—BOTTLE STOPPER AND COUPLING.—Wm. D. Brown, Milwaukie, Wis.

First, I claim the bottle, A, tube, B, and coupling, C, in combination, substantially as and for the purpose described.

Second, Coupling, C, when made with flange or flap, D, as described.

Third, Ferible stopple, E, when made with flange or flap, F, substantially as described.

65,538.—FURNACE FOR DESULPHURIZING ORE.—William Bruckner, San Francisco, Cal.

I claim the inclined partition, D, in the form of a deviating square or any other shape placed at any inclination or angle to ensure a constant passage around it of the material to be treated, said partition to be constructed of iron plates in sections or as a whole, and covered with fire-proof material, with surfaces flat or double concave, substantially as described and for the purposes set forth.

65,539.—WATER WHEEL.—E. G. Budd, Budd's Lake, N. J.

I claim the wheel proper, C C C C, D D D D, E E E and I, the leverage buckets, H H H H, with levers, I I I I, the adjustable wheel, F, with arm, G, constructed substantially as and for the purposes set forth.

65,540.—RAILWAY CHAIR.—Samuel S. Burt, Marquette, Mich.

First, I claim a three part railroad chair which is adapted for a reversible H, rail and so constructed that the base of the rail will be received and closely held partly by a recess, e, in the chair base and partly by recess, j j, the side supports, B, substantially as described.

Second, In combination with a double headed rail constructed with flat shoulders at c c, I claim a three part chair, A B B, with the lower head or base of the rail fitted into a recess, e, in the chair base, A and the lips of the rail heads sustained by the upper portion, C' C', of the side plates, B B, substantially as described.

65,541.—WAGON AXLE TREE.—Cornelius L. Campbell, Binghampton, N. Y.

I claim marking the skein of the same angle from end to end, in combination with the depressions, G G, on the large end or shank of the skein, substantially in the manner and for the purpose herein described.

65,542.—METRONOME.—Henry C. Carden, Paris, France.

I claim the combination of the ratchet wheel, f, mounted on an escapement wheel, e, with the rocking lever, u, the thread, v, and the spiral spring, z, in manner and for the purposes substantially as herein set forth and shown in figures of the annexed drawing.

65,543.—BOOT JACK.—Cyrus Clay, Scranton, Pa.

I claim the concave toe cup, C, handle, d, and ball, e e, as constructed and attached to the prongs, a a, in combination with a metallic boot jack, A, substantially as herein described.

65,544.—TURNING CURVE OF RAILROADS.—George Collyer, Philadelphia, Pa.

I claim the main rails, A and B, and the auxiliary rail, C, when used in combination with car wheels each having two threads, e f, the whole arranged and operating substantially as set forth.

65,545.—SEASONING AND PRESERVING WOOD.—S. Constant, Peekskill, John Smith, Brooklyn, N. Y. Antedated March 17, 1867.

We claim the chamber, A, generator, D, in combination with blowers, bellows or other suitable device to drive the heated air and smoky vapor out of the generator into the chamber, the connecting pipes, H and I, and escape pipe, K, all arranged and applied substantially as and for the purpose specified.

65,546.—MACHINE FOR DRAINING SUGAR.—Hiram A. Coppess, Greenville, Ohio.

First, I claim the rotating strainer of the form of the frustum of a cone as and for the purpose described.

Second, The combination of the conical distributor with the radial ribs, substantially as set forth.

Third, The rotating strainer, A, in combination with the conical distributor, B, the vertical shaft, S, the fast pulley, H', and the loose pulley, H, in the manner explained.

65,547.—FEED WATER HEATER.—William Crighton, William Wills and Louis Rastetter, Fort Wayne, Ind.

We claim the center pipe, c, in combination with concave and convex disks, for the purpose of distributing the water and steam, in the manner and for the purposes described.

Second, We claim the water and steam distributor, E, the same being constructed in the manner and for the purposes described.

Third, We claim the concave disk, D, in combination with the water and steam distributor, E, the same being constructed and operated in the manner and for the purpose described.

65,548.—MILK CAN.—A. P. Curry, Chagrin Falls, Ohio.

I claim the concave bottom, B, auxiliary bottom, C, and packing, D, as constructed and arranged in combination with the can, H, for the purpose and in the manner set forth.

65,549.—ATTACHING DRAFT TO VEHICLES.—G. S. Curtis (assignor to himself and Ellis G. L. Faxon), Chicago, Ill.

I claim the combination of the ordinary whiffletree, M, and pole, A, with the bed plate, B, the jaw, E, the rod, C, the rubber spring, G, and the washer, J, and the nut, N, for the purpose of tightening and loosening the spring, G, when all are constructed and operate substantially as and for the purposes herein described.

65,550.—WRENCH.—William P. Dunlap, Maquoketa, Iowa.

I claim a wrench constructed substantially as and for the purpose set forth.

65,551.—MEAT CUTTER.—Daniel S. Early, Hummelstown, Pa.

I claim the combination of the rotating cutter block, D, gearing, E F G I, cam shaft, J, and vertical spring choppers, F, constructed and operating substantially as described and represented.

65,552, 65,553.—Canceled.

65,554.—STOVE PIPE DRUM.—Adam Ernst, Milwaukee, Wis.

I claim the herein described heating apparatus, the same consisting of a drum or radiator capable of being applied to a stove or pipe of ordinary construction and provided with flues arranged substantially in the manner and for the purposes herein shown and described.

Second, The combination and arrangement of the inner or direct smoke flue and annular air chamber surrounding the same with the outer helical flue or radiator and the pipes or tubes for connecting the sections into which the said flue is divided substantially as herein described.

65,555.—CHANGE BOX.—James B. Eurtis, New Orleans, La.

I claim, First, The oscillating box, C, pivoted at its ends to the flanges of plates, B B, substantially as and for the purpose set forth.

Second, The oscillating box, C, pivoted at its ends in plates, B B, in combination with the bell, D, or its equivalent arranged and operating substantially as described and for the purpose set forth.

65,556.—BED BOTTOM.—J. S. Farrington, Milwaukee, Wis.

I claim top and bottom frame, E, with bell shaped openings with rubber, B, guide rods, A, and pins, D, all combined and arranged substantially as and for the purpose described.

65,557.—TOOL FOR CUTTING WIRE.—William H. Flinn (assignor to himself and James N. Kendall), Nashua, N. H.

I claim my improved wire or rod cutter made as described, viz: with each cutting hole of each pair of such holes of the plates, B and c, arranged obliquely to the touching faces of such plates, substantially as and for the purpose hereinbefore described.

65,558.—MOP WRINGER.—Charles W. Gage and James Northrup, Homer, N. Y.

We claim in connection with the mop pail, A, the stationary roller, B, and swinging roller, b, operated by the foot levers, D d, and springs, H, when so arranged that the rollers are opened by the foot levers and the wringing done by the springs, substantially as and for the purpose set forth.

Second, The joint formed between the levers, D d, by severing them at the foot rest, f, and pivoting their ends thereto, substantially in the manner and for the purpose set forth.

Third, The employment of the C, springs, H, as herein shown and the method for regulating the pressure, substantially as set forth and for the purpose described.

65,559.—ICE CREAM FREEZER.—Charles Gooch, Cincinnati Ohio.

I claim the combination of the concave scraper, I, to remove the frozen cream from the walls of the can, D, the convex agitator, H, extending from near the center of said can arranged with a space, I, between them and adapted to operate as herein described.

65,560.—LAST LOCK.—Dennis Goodyear, Ithaca, N. Y.

I claim, First, The described device composed of the parts, G, the ping or pin, F, the sheath and its dog or tooth and handle, D, or other convenient equivalent for turning and thus locking the same in the last as described.

Second, The device of a pin or plug thrust through the last block into the last and held there by friction, a dog or tooth or other convenient means when the locking is done by the cam-like action of the pin or plug as described.

65,561.—BOLT-HEADING MACHINE.—S. W. Goodyear and W. F. Parker (assignors to Charles Parker), Meriden, Conn.

First, The combination of the two heading punches, f and e, and spindle, l, with the revolving die plate, C, all constructed, arranged and operating substantially as set forth.

Second, The combination of the solid movable dies with the upsetting spindle, I, arranged as described, so as to recede after the blank is upset and allow the complete head to be formed after the said spindle has so receded.

Third, The cam, h, slide, m, and pawl, n, in combination with the pawl, P, and ratchet, R, arranged and operating substantially as herein described.

65,562.—JOINER'S PLANE.—Arthur Gray, Naples, Me.

I claim the combination of projection, e, on the back iron with the staple, k, and thumb screw, m, on the clamp, when arranged as and for the purposes set forth.

65,563.—METALLIC COMPOUND OR ALLOY.—Julius Hackert, New York City.

I claim a metal compound made of the ingredients herein specified and mixed together, substantially in the manner and about in the proportions set forth.

Also the addition of saltpeter and cream of tartar to a compound of copper and zinc, substantially as and for the purposes described.

65,564.—STILL.—George Hadley, Buffalo, N. Y.

I claim, First, A series of jackets of graduated temperature applied to the pipe of a still to eliminate by successive stages a fluid of given tenuity and return the heavier condensed vapors.

Second, A tube, a, leading from the still and provided at different points in its length with a succession of condensers adapted to condense successive portions of the vapor therein.

65,565.—MACHINE FOR MAKING CORDAGE.—James Hall, Monroe Township, N. Y.

I claim the arrangement of the spindles, 1 2 3, drum, D, truck, T, ways, W W, and rollers, E E', with the endless rope or belt, B, all operating together in the manner and for the purpose set forth.

65,566.—DOOR HOLDER.—John J. Harris and Isaac H. Mosher, Greens, N. Y.

I claim as a new article of manufacture the bolt, A, constructed and operating substantially as and for the purposes specified.

65,567.—SCREW MACHINE.—Harvey J. Harwood (assignor to himself and J. F. Lyman), Utica, N. Y.

I claim, First, The combination of the dies, I and K, and the guides, M M, constructed and operating substantially as described and for the uses and purposes mentioned.

Second, The combination of the said dies and guides and the set screw, M', constructed and operating substantially as described and for the uses and purposes mentioned.

65,568.—LATHE FOR TURNING WOOD.—Horace R. Hawkins, Akron, Ohio.

I claim the combination with a turning lathe of ordinary or suitable construction of a face plate and eccentric or driving center under such an arrangement that the arm of the axle placed in the machine may be turned with a combined gather and pitch, in the manner herein shown and specified.

65,569.—LIFTING JACK.—Azro Healy, Kalamazoo, Mich.

First, The arrangement and combination of the crime lever, L, lifting chain, M, and secondary lever, N, with the end ratchet, R, and foot pawl, P', substantially as and for the uses herein set forth.

Second, I claim the aforesaid arrangement of combined parts used in connection and combination with the lifting bars, F and E, lifting pawl, P2, and manipulating cords or wires, e and f, the several parts being arranged relatively with the frame of the jack and with each other, and constructed and operated substantially in the manner and for the purposes herein described.

65,570.—WELL TUBE.—A. E. Heberd, Homer, N. Y.

I claim the combination of the auger, D, secured to the tube, C, by bolt, F, cap, A, anvil, B, bar, G, with the tube, all constructed, arranged and operated as described.

65,571.—FEED CUTTER.—Henry Helm, Pittsburgh, Pa.

First, I claim the rotary eccentric knife, g, provided with slots, h h', in combination with the knife block, f, substantially as and for the purposes described.

Second, The projection, p, on the knife of a feed cutter in combination with the curved bar, l, provided with a notch or groove, l', substantially as and for the purpose above described.

65,572.—WATER WHEEL.—G. Wm. Holden (assignor to himself and James P. Upham), Claremont, N. H.

I claim, First, The guides, m, applied at the backs of the buckets of the water wheel, substantially as and for the purposes specified.

Second, I claim the reverse curves, l, at the outer ends of the water wheel buckets in combination with the guides, m, at the back and outer ends of the buckets, substantially as and for the purposes set forth.

Third, I claim the curved lower edge, n, of the bucket in combination with the guide, m, substantially as and for the purposes specified.

Fourth, I claim the movable curved section, u, hinged to the swinging section, s, that moves with the shaft, t, substantially as and for the purposes set forth.

Fifth, I claim the segmental gate, p, in combination with the movable curb section, u, and swinging section, s, and curb section, c, for the purposes set forth.

Sixth, I claim the lever, r, fitted substantially as specified in combination with the swinging section, s, and curb section, c, for the purposes set forth.

Seventh, I claim a horizontal shaft, z, extending from the step for the shaft, c, to the outside of the water way to one end of which mechanism is applied to turn the same, substantially as specified, and the other end is fitted to act upon the step to raise or lower the same by substantially the means specified.

65,573.—HORSE RAKE.—James Hollingsworth (assignor to J. M. Wanzer), Chicago, Ill.

First, I claim the construction of a rake tooth bearing, J, with three passages at right angles to each other when said bearings are of a form to abut directly against one another and the teeth extend clear through the top passage of the bearing, substantially in the manner and for the purposes described.

Second, The construction of the eye bearings, g, for suppoating the rake teeth, T, and holding the spring, substantially as described.

Third, The combination of the jointed bearings, J, and eye bearings, g, with a rake tooth of the form substantially as herein described.

Fourth, The combination of the bearings, J, with set screws, l, the rocking frame with its arms and the eye bearings, g, with their springs, substantially in the manner and for the purposes described.

65,574.—CAR SPRING.—Edwin J. Horner, Wimington, Del.

I claim a series of oblong metallic semi-elliptical plates each having an opening, x, near its center arranged together as herein shown with full elongated ellipses between semi-elongated ellipses placed within a box, A, having a vertical rib, d, whereby they are alone secured in their proper places and held by the pressure of a grooved block, B, in the manner as herein specified.

65,575.—LOZENGE MACHINE.—John S. Howell and Charles W. Carter, Portsmouth, N. H.

We claim the combination and the arrangement of the roller, a, and the traversing carriage, f, carrying the cutters, c c, clearing board, e, and receiving board, g, all combined for joint operation, substantially as set forth.

65,576.—WINDING TATTING SHUTTLE.—H. P. Jones, Davenport, Iowa.

I claim the employment of sliding tubes or rings, a a, upon the ends of the rotating rod, D, so as to receive and secure in place tatting shuttles of different lengths, substantially as and for the purpose described.

65,577.—POST-HOLE AUGER.—John Killgore, G. D. Clapsaddle and Edward Snart, Arcola, Ill.

We claim the arrangement of the sleeve, J, and its pin, K, with the shaft, H, frame, B, and band, G, substantially as and for the purpose herein specified.

65,578.—CORN DROPPER.—Robert P. Killin, Canton, Ohio.

I claim the separator, J, attached to the valve standard, B, in the manner and for the purpose herein specified.

Second, The spring, H, attached to the valve standard of this or any other seeding machine, substantially in the manner and for the purpose herein set forth.

Third, The mode of construction of the valve standard, B, the rod, X, being made of wrought iron and the part, Y, of cast iron, substantially in the manner and for the purpose herein specified.

65,579.—METHOD OF MAKING SIDE BANDS OF WATCH CASES.—George W. Ladd (assignor to John A. Brown), Providence, R. I.

I claim the method of constructing the side band for watch cases, substantially as herein described for the purposes specified.

65,580.—MEDICAL PREPARATION.—Charles L. Lege, San Antonio, Texas.

I claim the invention of making this powder and its application as a poultice and a medicinal remedy against the scurvy, as herein described.

65,581.—METHOD OF CASTING TWEERS.—William P. Lewis, Pittsburgh, Pa., assignor to himself and Wm. H. Sims.

I claim the method of beveling the ends of the center pipe of a tweer, substantially as described, and casting the ends of the outer shell of the tweer on to and around the surfaces so beveled or flanged, substantially as and for the purposes set forth.

65,582.—SAFETY GUARD FOR RAILWAY CARS.—Samuel Males, Cincinnati, Ohio.

First, I claim the adjustable guard made in sections encasing the wheels substantially as and for the purpose set forth.

Second, The arrangement of ratchet bow, catch, links, bolts, nuts and springs which admit of the perpendicular adjustment of the guard, substantially as described.

65,583.—POTATO DIGGER.—George Meader, Prairie Centre, Ill.

I claim the combination of the standards, D, and the fork, C, or its equivalent, provided with suitable handles, and arranged and operating substantially as and for the purposes specified.

65,584.—MOP HEAD.—George Meader, Prairie Centre, Ill.

I claim the combination of the handle, A, plate, B, jaw, C, and latch, D, all arranged and operating substantially in the manner and for the purposes specified.

65,585.—BREECH-LOADING FIRE-ARM.—Isaac M. Millbank, Greenfield Hill, Conn.

First, I claim the segment of a cylinder, i, within a recess at the rear end of the swinging breech block, c, in combination with the lever, f, that is employed for both turning the said segment, i, and opening or closing the breech by the block, c, substantially as and for the purpose set forth.

Second, I also claim supporting and guiding said segment, i, by the cylindrical portion at x, as set forth.

65,586.—FURNACE FOR REDUCING METALLIC ORES.—Eugene Wm. Nohl, Ripon, Wis., assignor to himself and Edward Daniels, Chicago, Ill.

First, I claim a furnace provided with short pipes or passages for introducing the gas, hot from the generator, into the furnace, and also with a blast of air, the meeting currents of gas and air directing the flames upon the ore, substantially in the manner and for the purposes set forth.

Second, I claim the raised center of the bed of the furnace for supporting the ore, and allowing the fused metal to flow away from the central heat and be drawn off without being overheated or burnt, substantially as described.

Third, I claim a gas generator provided with a blast, in combination with a furnace for burning the gas before cooling, substantially in the manner and for the purpose specified.

65,587.—BRACE FOR SUPPORTING THRASHING MACHINES.—J. G. Northway, Kemosha, Wis.

I claim the combination of bed, A, brace, B, and dog, C, when arranged substantially as set forth.

65,588.—SELF-ADJUSTING WRENCH.—A. M. Olds, New York City. Antedated May 27, 1867.

I claim the above-described wrench as an improved article of manufacture.

65,589.—PLIERS.—A. M. Olds, New York City. Antedated May 27, 1867.

I claim the combination of the handles, segmental spiral arm, and movable jaw, substantially as arranged and described.

65,590.—MACHINE FOR MAKING PAPER TUBES.—James A. Olney, Providence, R. I.

I claim the combination as well as the arrangement of the endless pasting or covering belt, B, the trough, F, the presser, G, the fluted roller, H, the discharger, K, and the scissors, O, the said belt, scissors, roller, and discharger being provided with mechanism for operating them substantially as described.

I also claim the combination as well as the arrangement of the endless pasting belt, B, the trough, F, the feed roller, M, the fluted roller, H, the discharger, K, and the scissors, O, the said belt, feed roller, scissors roller and

discharger being provided with mechanism for operating them substantially as described.

I also claim the combination as well as the arrangement of either or both of the devices, t u, the endless carrying and pasting belt, B, the trough, F, the presser, G, the fluted roller, H, the discharger, K, the scissors, O, such belt, scis ors, roller, and discharger being provided with mechanism for operating substantially as hereinbefore described.

65,591.—GATE.—Calvin H. Paine (assignor to himself and Wm. D. Hilton), Providence, R. I.

I claim the combination of the chambered posts, or their equivalents and the folding gate made of the crossed bars connected as described.

I also claim the combination of the chambered posts or their equivalents, the folding gate and mechanism substantially as described, for operating such gate in manner as explained.

65,592.—FENCE.—Calvin H. Paine (assignor to himself and Wm. D. Hilton), Providence, R. I.

I claim the fence as made with the lazy tongs, or folding section or body, arranged and combined either with grooved posts or the same and rails, substantially as specified.

65,593.—APPARATUS FOR AMALGAMATING AND COLLECTING GOLD AND SILVER FROM ORES.—Wm. P. Parrott and J. J. Bordman, Boston, Mass.

We claim a combination consisting not only of one or more rollers and one or more troughs of mercury or for holding mercury, but of one or more scrapers, or their equivalents, for removing the amalgam from the surface or surfaces of such roller or rollers, the whole being substantially as described.

We also claim the arrangement of two rollers and their mercury troughs so that the said rollers while in revolution may take up the mercury from the trough and by their combined action press it against or cause it to adhere to and spread evenly on their surfaces.

We also claim the construction of the mercury trough so as to extend up between the two rollers and guide the mercury up to their bite while they are in revolution, the same being as exhibited in fig. 6.

We also claim the combination of the heating chamber, E, or a means of heating the trough of mercury or the same and its roller or rollers, with the said trough, the roller or rollers, and the scraper or scrapers thereof, as specified.

We also claim the arrangement of the auxiliary rollers, R R, with the main rollers, B C, their scrapers, and mercury trough, as explained.

We also claim the combination as well as the arrangement of the rifle, O, with the trough, D, one or more rollers, B C, and one or more scrapers, N N.

We also claim the combination of mechanism for imparting to either or both of the rollers, B C, endwise movements under circumstances as set forth, with such rollers, the mercury trough, and the scrapers or their equivalents, the whole being substantially as specified.

65,594.—BLAST APPARATUS FOR CARBURETERS.—F. S. Pease, Buffalo, N. Y.

I claim the arrangement of the shaft, A, cams, B B, dividing the circle and operating the bellows of corresponding numbers, which are adjusted as to capacity by the check string, c, the whole constructed and operated substantially as described and represented.

65,595.—BLAST APPARATUS FOR CARBURETERS.—F. S. Pease, Buffalo N. Y.

First, I claim the double bellows, A, so constructed that the sections are reciprocally operated by the same impulse from crank or eccentric on a rotary or vibrating shaft, substantially as described.

Second, The combination of the rotary or vibrating shaft, G, provided with cranks or eccentrics, the connecting rods, H, and series of double bellows, A A, substantially as described.

65,596.—SHIRT BOSOM.—George B. Perkins (assignor to Burlock Manufacturing Company), Bridgeport, Conn.

I claim a bosom attached to the shirt over the bosom proper thereof, expanding in width from its attachment to the collar band, and narrowing in its approach to the waist, as shown, and strengthened longitudinally by cording, all substantially as described.

65,597.—CONSTRUCTION OF POTS FOR CHARRING OR BURNING BONES.—C. W. Pierce, Albany, N. Y.

I claim in the construction of pots for use as described, the division of the bottoms of the pot into parts, separated from each other by slots, constructed and arranged as described and for the purposes set forth.

65,598.—HARDENING SAWS.—Edwin S. Piper (assignor to himself and Atkins and Company), Indianapolis, Ind.

First, I claim the preventing of springing of saws during the process of hardening.

Second, The construction of the clamps.

Third, The combination of the lever, N, cam, M, hook, K, rim, L, double hook, T, plunger, G, and knuckle joints, H H, with the clamp, D, and clamp, F, all arranged and operating substantially as set forth and for the purpose described.

65,599.—HOT BLAST STOVE.—John Player, Norton, England

I claim the constructing and arranging of a hot-blast stove to be used with coal or solid fuel, with three distinct chambers, in the manner herein described.

Also the use in conjunction therewith of a steam jet as herein described.

I also claim the use of a steam jet, to draw down the gases from the top of the blast furnace and to force it into the stove for heating the blast.

65,600.—APPARATUS FOR HEATING THE BLAST FOR FURNACES USED IN SMELTING IRON, ETC.—John Player, Norton, England.

I claim the constructing or arranging of a hot-blast stove in the manner herein described, whereby the waste gases are ignited and consumed in a chamber separate from a the chamber within which the pipes are contained.

65,601.—HINGE.—Jay W. Powers, Evanston, Ill. Antedated May 28, 1867.

I claim the cam, D, applied to a triplicate hinge, constructed and operating substantially as and for the purposes herein set forth.

65,602.—CAR COUPLING.—Stephen Puffer, Oxford, N. Y.

First, I claim the combination of cams, c, with the pivot ends of a detachable swivel-jointed coupling link, E, when said ends are so arranged as to be struck by the collision of the cars when thrown back upon the bumper.

Second, I also claim the combination of a detachable bumper block with either bumper of a railway car, and with a swinging coupling link, all substantially in the manner and for the purposes set forth.

65,603.—FERRULE FOR STOPPING LEAKS IN BOILER TUBES.—Patrick Quinn, South Newmarket, N. H.

I claim the gland and the expander as made not only with the male and female screws, and with either or both tapering as specified, but as having a keyhole formed in the bore of the expander, as set forth.

65,604.—FORMING PROJECTIONS ON THE CAPS OF PLANE IRONS.—N. B. Reynolds, Auburn, N. Y.

I claim the method of construction substantially as described.

65,605.—SNOW PLOW.—Samuel Richards, Philadelphia, Pa.

I claim the combination of the inclined plane, A A', and the movable wedge block, B, and the pivoted flap, c, arranged and operating substantially as described.

65,606.—LET-OFF FOR LOOMS.—George Richardson, Lowell, Mass.

I claim the combination of the whip roll finger, e, tension rod, f, tension spring, k, grooved or equivalent shaped wheel, o, and strap or band, n, arranged and operating together substantially as and for the purpose herein specified.

I also claim the combination of the cam, h, adjustable finger, g, rod, f, and strap, n, for producing a positive stop to the let-off motion while beating up the woof, substantially as herein specified.

65,607.—BREECH-LOADING FIRE-ARM.—B. S. Roberts, United States Army.

First, I claim the combination with a breech piece, B, which springs about a curved abutment, c, a rocking block, g, so applied to said breech piece as to allow of the opening and closing of the breech of the barrel for the insertion or withdrawal of a cartridge substantially as described.

Second, The lever, B', formed on the rear curved end of the swinging breech piece, B, and adapted to move about the solid abutment, c, in combination with a rocking block, g, which will admit of the opening and closing of the breech, substantially as described.

Third, I claim the groove, m, in the rocking block, g, operating on the lever at the shoulder, n, so as to extract the cartridge, substantially as described.

65,608.—METHOD OF HANGING WINDOW SASH.—William Robertson, Plymouth, Ind.

I claim the pulley block, F, when constructed and arranged substantially as and for the purpose set forth.

65,609.—LUBRICATOR.—Robert Ross and B. E. Lehman, Bethlehem, Pa.

First, We claim the combination of the spindle, D, its valve, f, cap, k, spring, m, projection, n, and passages, p p', the whole being constructed and arranged in respect to the mouth and reservoir of the oil cup, substantially as and for the purpose herein set forth.

Second, The combination of the above and the hollow spindle, D, its vent hole, b, and the set screw, F, for the purpose specified.

Third, The ring, C, resting with its notched under edge in the mouth, A, and forming a rest for the spring, I, all as set forth.

Fourth, The detachable annular strainer, H, constructed and combined with the ring, C, spindle, D, and spring, I, as described.

65,610.—SEEDING MACHINE AND FERTILIZER.—A. P. Routt, Liberty Mills Va.

First, I claim the furrowing tooth, C, having the broad reversible plate or shovel, w, and the brace, y, substantially as and for the purpose specified.

Second, The agitator, M, in the fertilizer box, having the arms, z z' z'' z''' substantially as and for the purpose described.

Third, The construction of the conducting tubes, feed box, and distributing roller in such a manner as to show at S the distributing roller, N, and the interior of the conducting tube, H, substantially in the manner and for the purpose specified.

65,611.—SCUTTLE DOOR FOR BUILDINGS, DRY DOCKS, AND VESSELS.—Joseph Ryan, St. Louis, Mo.

I claim the combination and arrangement of a scuttle door, B, having one or more fire safety openings, d', and conducting and distributing hose or pipes, d2 d3 d4, with decks, ropes, etc., substantially in the manner and for the purposes herein set forth.

65,612.—BRICK MACHINE.—Henry C. Sergeant, Columbus, Ohio.

First, I claim lowering the followers at intervals, or continuing the lowering while under the pug mill as the molds are being filled to facilitate the filling of the corners of the molds.

Second, I claim the adjustable striker plate, having a bolt or slot for clamping, as shown and described.

Third, I claim the arm, D, having an intermittent motion in combination with the rise in the track, as shown and described.

Fourth, I claim the plus or projections on the rim of the mold wheel for giving motion to a pressure plate or arm, D, or its equivalent, as shown and described.

65,613.—BRICK MACHINE.—Henry C. Sergeant, Columbus, Ohio.

First, I claim the weight E, with its arm when made to hinge and turn upon the shaft of the mold-wheel for the purpose specified.

Second, I claim the inclined tracks when attached to the periphery of the mold wheel for raising or dropping a weight upon the face of the brick for finishing, as shown and described.

Third, I claim the arm, toe, and incline on the end of arm for facilitating the raising and getting the weight back to its place.

Fourth, I claim the stop, I, attached to the arm or weight, E, when operated to drop into holes or notches for the purpose of preventing the weight from sliding on the brick when being raised up, as shown and described.

65,614.—COVER FOR GRIDIRONS.—Reuben Shaler, Madison, Conn.

I claim a cover having an opening, C, and protected from below by a plate, D, substantially as and for the purpose specified.

65,615.—BUTTON-LACING HOOK.—William H. Shurtleff, Providence, R. I. Antedated May 9, 1867.

First, I claim making a button hook in which the hook is within the periphery of and eccentric to the bottom of two, separate and distinct, united together at or near the center of the button, substantially as herein shown and described.

Second, As a new article of manufacture, I claim a lacing hook and button, in which the button is made of horn, hoof, rubber, or other like material, and the hook of metal, the two being combined together substantially in the manner herein shown and described.

65,616.—PLATE LIFTER.—Daniel M. Skinner, Sandwich Centre, N. H.

I claim the plate lifter made as described, viz.: of a wire bent as shown at a b c d f g h i k l, so as to form the elastic handle portion, A, and two open jaws, B B, as represented.

65,617.—CAP FOR UPHOLSTERER'S SPRINGS.—Ambrose Tower, New York City.

I claim a grooved metallic cap for upholstery springs, having arms, A and B, eyes, G, and attachments, D, constructed and arranged substantially as herein specified.

65,618.—TART CUTTER.—John H. Treadwell, Swampscott, Mass.

I claim the tart cutter, as made with the die, C, and the cutter box, A, arranged as specified.

I also claim the combination of the handle, B, the cutter box, A, and the die, C, arranged as specified, the said box being provided or not with air holes as described.

65,619.—GATE.—H. B. Van Voorhis, Pittsburg, Pa.

First, I claim the combination of the slotted plate, A, slotted lever, B, and pin, C, substantially as and for the purpose set forth.

Second, The combination of these devices with the catches, L and N, as and for the purpose set forth.

65,620.—CHURN.—Aaron Votaw, New Garden, Ohio.

I claim the arrangement of the breakers, E, and ribs, H I, in combination with the case, C, when operated in the manner and for the purpose, substantially as set forth.

65,621.—LAMP FOR BURNING OFF PAINT.—William W Wakeman, Jr., New York City.

First, I claim the reservoir, A, placed over the lamp, L, substantially as and for the purposes herein set forth.

Second, The expanded mouth, G, the pipe, F, or its equivalent, substantially as herein described.

Third, The independent lamp, L, operating substantially as and for the purpose herein specified.

65,622.—WAGON AXLE AND BOX.—John N. and Theodore Wallis, Fleming, N. Y.

First, We claim the collar, D, in combination with the thimble, E, and box, B, when all are constructed, arranged, and operated substantially in the manner and used for the purpose specified.

Second, Securing the sand band, , to the box, B, as and for the purpose specified.

65,623.—CHURN.—Chauncey E. Warner, Syracuse, N. Y.

First, I claim the hinged beaters f, in combination with the shafts, B C, and gears, b c D, all constructed and operating as and for the purpose herein shown and described.

Second, In connection with the above, I claim also the sliding hub, m, for adjusting the upper beaters to varying quantities of cream, as and for the purpose set forth.

65,624.—FOOT SCRAPER.—James Whait, Springfield, Mo.

I claim the hinged hollow side D D, in combination with the scraper, B, all constructed and arranged as and for the purpose set forth.

65,625.—WATER ANCHOR.—Norman W. Wheeler, Brooklyn, N. Y.

First, I claim the water anchor herein described, when the ropes, f f, are so arranged in reference to the cone pieces, C D, as to expand the anchor by their tension, in the manner and for the purposes described.

Second, In combination with the above, the spilling line attached, and operating substantially as and for the purposes described.

Third, The combination of weight, I, canvas, E, and cross pieces, A A, when arranged in the manner described.

65,626.—DISH COVER.—William H. White, Kent Island, Md., assignor to himself and George W. White.

I claim the combination of a skeleton frame and a fabric cover, when the former is shaped and constructed to hold in place a fabric cover, and the latter made detachable from the frame, for the purposes herein shown and described.

65,627.—QUILTING FRAME.—Aaron S. Winner, Clark Co., Ill.

I claim the construction of the self-supporting trestles or benches with the gains, in combination with the wheels and catches, arranged in the manner and for the purpose described.

65,628.—PAPER REEL FOR TELEGRAPHIC REGISTER.—Lewis W. Worth, Sonoma, Cal.

I claim the rails, B C, adjustable drum, F, with ratchet, P, pawl, R, and spring, S, with cord, L, and weight, W, for the purpose herein specified as set forth.

65,629.—BEEHIVE.—William J. Andrews, Columbia, Tenn.

First, I claim the semi-circular pieces, F F, the movable covers or caps, G G, and the upright bar, when used in the manner and for the purpose as herein specified.

Second, I claim the bee moth trap, K, when it is provided with the grated cover, I, and feeding passage, L, arranged in the manner and for the purpose specified.

65,630.—CHECKING THE DRAFT IN FURNACES.—Jonas C. Bognall, St. Louis, Mo.

I claim the arrangement of a door, b, in the smoke stack of a reverberatory furnace and above the reverberatory line thereof, substantially as and for the purpose described.

65,631.—COMBINATION SQUARE.—D. A. B. Bailey, St Johnsburg, Vt.

I claim the frame, B', the face pieces, D, the circle, E, and the points, g g, the whole constructed, arranged, and held in position substantially as herein shown and described, in combination with the square, for the purposes set forth.

65,632.—BAG FASTENER OR TIE.—D. B. Baker, Rollersville, Ohio.

I claim the metallic clasp for bags, constructed as described, consisting of the semicircular plates, A A', whose wide sides rest against the bag, connected at one end by the link, B, the opposite ends fastened by means of the triangular projections, a, catching into the perforations, c, the part, A, provided with the finger, d, as herein shown and described.

65,633.—VELOCIPEDE SLED.—John Bannihr, Hempstead, N. Y.

I claim the arms, n, pivoted on wheel, C, on each side of a sled, in combination with the levers, D, or their equivalent, for rotating the wheels, constructed and operating substantially as herein set forth.

65,634.—SEED CARRIAGE.—N. S. Bean, Manchester, N. H.

First, I claim in combination with the reel and its shaft, a winding shaft, b, arranged in the frame, a, and connected to and rotating the reel shaft through the medium of the pulleys and their chains, substantially as shown and described.

Second, The arrangement of the reel shaft in bearings directly on the frame, a, and directly over the carriage axle, when such axle is bent to permit the reel head to turn free from the same, substantially as set forth.

Third, The construction of each reel head of a concave disk, having shrunk upon the circumference thereof a grooved ring or tire, substantially as shown and described.

Fourth, The combination with the reel the fuel boxes arranged on each side under the frame of each box, having a discharge opening and thereof at its bottom, substantially as set forth.

65,635.—BRICK PRESS.—Christopher Becker, Flint, Mich.

I claim a brick press, consisting of a combination of the box, A, block, B, plunger, D', and sliding covers, H H', with each other, and with a suitable mechanism for operating the same, all made substantially as herein shown and described, and operating in such a manner that the bricks are pressed in the molds, G G', as set forth.

65,636.—CORSET.—Myron H. Beckworth, Camden, N. Y.

I claim a belt applied over and upon the seam around the waist part of the corsets, substantially as and for the purposes set forth.

65,637.—BLACKING DISH AND KNIFE.—E. L. Bolster, Waterbury, Conn.

I claim a dish provided with a knife or cutter blade substantially as and for the purpose described.

65,638.—WIRE CUTTING PINCERS.—Peter Broadbooks, Batavia, N. Y.

I claim the legs, b, b', and spring, d, secured together by means of the rectangular collar, a, fitting over and working upon the heads, e, e, of the legs, b, b, and spring, d, the latter connected to the leg, b, by means of the knuckle joint composed of the knuckle, g, and socket, h, all constructed and arranged substantially as described for the purpose specified.

65,639.—METALLIC SURFACE COATING COMPOSITION.—G. Brown, E. E. Burnham, and J. Morrise, Gloucester, Mass.

We claim the composition made substantially in manner and of the ingredients set forth, and we especially claim its combination with naphtha or the equivalent thereof, the whole being substantially as and for the purpose as hereinbefore specified.

65,640.—DIVAN AND BED.—Henry Buehler, New York City.

I claim a divan constructed substantially in its seat and back portions so as to be used and adjusted substantially as described for the purposes specified.

65,641.—DIES FOR FORMING THILL COUPLINGS.—L. Burns, (assignor to himself and Joseph Wilcox,) Portchester, N. Y.

First, I claim the thill coupling constructed as described, by swaging the blank, A, in the dies, D, E, and M, N, as herein shown and described for the purpose specified.

Second, the dies, D, E, provided with the holes, F, and opening, H, the dies, M, N, with equal shoulders, L, all constructed as described for the purpose of forming the thill coupling substantially as herein set forth.

65,642.—METHOD OF FORMING WHEELS, TIRES &c., BY CASTINGS.—William Butcher, Jr., Sheffield Eng., Thomas Shaw, Philadelphia, Pa.

First, We claim as our improvement, the method of forming tires, wheels and other articles of metal by casting, supporting the mold whilst the melted metal is being poured into it, upon being unconfined to a revolving disk, substantially as and for the purposes specified.

Second, In combination with a mold and revolving disk as set forth in the foregoing clause we claim the two rings, h, and i, or their equivalents substantially as and for the purposes specified.

65,643.—COTTON GIN.—Jules Alfred Chaufourier, Paris, France.

First, I claim the self-feeding apparatus consisting of the racks or combs k, N, and P, and the manner of operating the same substantially as shown and described.

Second, The self operating refrigerator or bellows, I, for the purpose of conducting a current of air towards the driving or carrying cylinder, H, substantially as herein shown and described.

Third, One or more supporting cylinders R, for the purpose of preventing a deflection of the shelling cylinders substantially as herein shown and described.

65,644.—TOY ROPE DANCER.—Dominico Cheekeni, Brooklyn, N. Y. Antedated June 5th, 1867.

I claim the lever, E, the bells, H, the rope, D, and figure, I, (or its equivalent) in combination with the cross trees, B, B, and platform, A, substantially as and for the purposes described and set forth.

65,645.—SASH LOCK.—Charles B. Clark, Buffalo, N. Y.

First, I claim the combination of the eccentric roller, D, for sustaining the sash, with the weighted roller, F, and case, C, for holding the sash up and locking the same down, substantially as described.

Second, In combination with the eccentric roller, D, the hollow cylindrical stud, E, forming a portion of the case and receiving the screw, e, arranged substantially as and for the purposes set forth.

65,646.—STEAM TRAPS.—Richard Colburn, Norwich, Conn.

I claim the arrangement of the valve, its case, and induction and eduction passages substantially in manner as described, in order that the valve when in use with a cylinder and piston as explained, will be closed by the pressure of steam and when relieved therefrom will be opened by its own weight, the whole being in manner and under circumstances as explained.

I also claim the combination of the screw, l, or its equivalent with the valve, its seat, chamber, and induction and eduction passages arranged substantially as explained.

64,647.—COTTON SEED PLANTER.—J. A. Cox, Humbolt, Tenn.

First, I claim the combination with the seed box, E, and hopper, F, of the colter, C, and opener, D, substantially as and for the purpose set forth.

Second, The combination with the colter, C, and opener D, of two harrow teeth, J, J, substantially as and for the purpose specified.

Third, The combination with the opener, D, and hopper, F, of the coverer, I, substantially as and for the purposes herein above set forth.

65,648.—WELL TUBE.—S. F Craig, Eddyville, Iowa.

I claim the combination and arrangement of the perforated end, A, of the well tube, around which the wire screen or gauze, B, is placed, point, D, secured to the end of said tube, forming the chamber, E, and air passage, G, as herein set forth, for the purpose specified.

65,649.—ROTARY DOUGH DRESSER.—George H. Cross, Montpelier, Vt.

I claim the revolving brush, A, upon the shaft, b, b, in combination with the box, B, adapted for dressing dough to prepare it for the manufacture of crackers, as herein shown and described.

65,650.—SPINNING FRAME.—J. E. Crowell, Chelsea, Mass.

I claim in combination with the fliers of a spinning frame, drawing rolls arranged within the fliers, when one of said rolls in each flier is directly upon the spindle and meshes into and drives the others, substantially as shown and described.

I also claim combining with the drawing rolls, and the fliers of a spinning frame, a detainer bar interposed between the drawing and twisting mechanism and the delivery rolls substantially as and for the purpose described.

65,651.—WOOD SCREWS.—George C. Davis, (assignor to the Davis Screw Company,) Dayton, Ohio.

First, I claim making wood screws with a tapering core from neck to point, with threads of equal pitch and external diameter, but of gradually but more rapidly increasing depth from the base to near the apex of the said core, where they again diminish and die out into a central point.

Second, Making wood screws with a core tapering from its base to its point, with threads of equal pitch and external diameter but of gradually increasing depth from its base to near the point where it again diminishes and dies out in combination with a shank with parallel sides or tapered from about its centre where it joins the core substantially as set forth.

65,652.—MACHINES FOR MAKING CLASPS FOR HOOP SKIRTS.—Adolph Delkescamp, (assignor to John A. Newbould,) New York City.

I claim the swinging bending bar, o, in combination with the slide, i, dies, d, and n, and punch, e, substantially as and for the purposes set forth.

65,653.—NAPKIN HOLDER.—William L. Dewey, Bridgeport, Conn.

I claim as a new article of manufacture a napkin holder constructed as described consisting of the pedestal, A, into which are screwed or riveted spring arms, B, in one piece and forming nearly a circle with their ends bent over at D, as herein shown and described.

65,654.—COMPASS USED IN CALKING SEAMS.—George Dowling, Fair Haven, Conn.

I claim in combination with the compass, A, the additional or adjustable leg, f, and adjusting arc d, when constructed and operating substantially as described.

65,655.—COTTON PRESS.—James E. Duvoll, Sardis, Mississippi.

I claim operating the follower or plate, H, through which the medium of the ropes, E, I, K, applied in connection with the wheel and shaft, C, D, and the capstan, F, all arranged to operate in the manner substantially as and for the purpose set forth.

65,656.—EVAPORATING PANS.—S. P. Dyer, Prairie Depot, Ohio.

First, I claim the skimmers C, constructed arranged and operated substantially as herein shown and described, and for the purpose set forth.

Second, The combination and arrangement of the strainer, G, gates, H, R, S, T, and operating levers, I, L, M, N, with the partitions, G, U, V, M, of the pan substantially as herein shown and described and for the purpose set forth.

Third, The combination of the stationary strainer, A', with the finishing pan, X, substantially as herein shown and described and for the purpose set forth.

Fourth, The arrangement of the dampers, G', H', I', and flue partitions, E', F', with each other substantially as herein shown and described and for the purpose set forth.

65,657.—PREVENTING INCRUSTATION IN STEAM BOILERS.—Charles James Eames, New York City.

I claim the mode of preventing the incrustation in steam boilers substantially as herein described.

65,658.—MANUFACTURE OF REFINED SUGAR.—Edward P. Eastwick, Baltimore, Md.

I claim the mode substantially as herein described of obtaining from sugar of one quality, solutions of different qualities for the purpose specified.

65,659.—ROAD SCRAPER.—N. Evinger, Sand Ford, Ind.

First, I claim the combination and arrangement of the scraper plate, A, beams, C, chain, D, draft bar, E, and connecting bar, L, with an ordinary plough, N, substantially as herein shown and described.

Second, The combination of the pivoted arm, H, and caster wheel, G, with the beam, C, substantially in the manner herein shown and described and for the purpose set forth.

Third, The combination of the lever, R, with the plow beam, m', and draft bar, E, substantially as herein shown and described and for the purpose set forth.

65,660.—COMPOSITION FOR PAVEMENT.—W. P. Ford, and A. A. Moore, Concord, N. H.

We claim a composition for pavements, &c., made up of the specific ingredients combined together, substantially as set forth.

65,661.—ANIMAL TRAPS.—A. Frost, Seymour, Ind.

First, I claim the plate levers, a, a', constructed and arranged so as to open or close simultaneously the doors, b, b', substantially as set forth.

Second, The doors, b, b,' provided with loops, l, l, in combination with levers, a, a', as and for the purpose set forth.

Third, The spring platform or treadle, d, provided with slot, o, for engaging with the lever, a', as and for the purpose described.

65,662.—MOP HEAD.—O. S. Garretson, Buffalo, N. Y.

I claim the jaw frame and socket, C D, composed of a single piece of malleable metal in combination with the cross head, B, and screw shank, A, or its equivalent, when said jaw and socket have a reciprocating movement in consequence of the revolving of the socket, or of a nut connected therewith, or of the screw within the same substantially as herein described.

65,663.—SCARF SUPPORTER.—D. George, Boston, Mass.

I claim a scarf or neck tie supporter, constructed to operate substantially as set forth.

65,664.—MANUFACTURE OF STARCH.—J. J. Gilbert, Little Falls, N. Y.

First, I claim the separator, D, constructed and arranged substantially as herein shown and described for the purposes set forth.

Second, I claim the depositor, H, constructed substantially as described for the purposes set forth.

Third, In combination with the separator, I claim the vats arranged substantially as described and for the method herein described of manufacturing starch.

65,665.—TREADLE MECHANISM FOR SEWING MACHINES.—William Smith Hall, Quincy Mass.

I claim combining a machine shaft with a treadle by a ratchet, pawl-lever and connecting rod, arranged to operate together, substantially as described.

I also claim the double sets of treadle levers, pawl levers, pawls and ratchets, arranged to operate both independently or in conjunction, substantially as set forth.

65,666.—EXTENSION HORSE.—R. Hammill, Mineral Point, Wis.

First, I claim the manner of attaching the folding legs, A, A, to the beam, B, of a horse or trestle, by means of slotted pins, b, staples, c, and keys, d, all made and operating substantially as herein shown and described.

Second, The extension beam, B, in combination with the legs, A, D, all made and operating substantially as herein shown and described.

Third, The braces, C, and E, in combination with the legs, A, and beam, B, made so as to be folded to the beam and legs if desired as set forth.

Fourth, Connecting and supporting the inner ends of the two halves of the extension beam, B, by means of bands, a, and a tongue, b, which is provided with pins, l, l, and which is confined in grooves, g, between stops k, substantially as set forth.

Fifth, An extension and folding horse or trestle made and operating substantially as herein shown and described.

65,667.—STEAM HEATING APPARATUS.—S. T. Harker, Milwaukee, Wiss.

I claim a steam heating apparatus consisting of fire chambers, A, with coil C, on three sides, water and steam dome, B, on the fire chamber with a smoke passage through it large at the bottom and contracted at the top, and both ends of the coil C, entering the dome below the water line, all arranged and combined substantially as described.

65,668.—WOOD SCREWS.—Harvy J. Harwood, Utica, N. Y.

First, I claim forming the end of the screw into a lip or lips substantially as described.

Second, Extending the lip or lips of the screws beyond the terminus of the core substantially as described.

Third, Retaining the full size of the screw at the point without continuing the core to the point.

Fourth, Increasing the pitch between the lip and first thread substantially as described.

65,669.—SAWING MACHINES.—Henry Hassenpflug, (assignor to himself and Edward Hassenpflug,) Huntington, Pa.

I claim the arrangement of the lever, m, plate n, shaft, i, levers, j, k, and I, by which motion is imparted from the shaft, C, to the reciprocating G, as herein set forth for the purpose specified.

65,670.—FIELD FENCE.—Joel Heacock, Marlboro, Ohio.

I claim the combination and arrangement herein described of the rails, A, A, battens, B, B, braces, C, and sill, D, when all are constructed of the ordinary split rails to form the panels of a field fence, substantially in the manner and for the purpose set forth as described.

65,671.—BUTTON HOLE CUTTERS.—Herrman Hempel, New York City.

I claim the sliding block, D, when secured to the jaw, d, by means of straps, g, g, and when held in position by a spring catch, h, fitting into one of a series of holes arranged on one side of the jaw, d, all as set forth.

65,672.—ROSETTES.—F. L. Hilbright, and F. Reynold, Newark, N. J.

I claim the die, A, consisting of the part, B, fixed to the flanged rod, the part, C, hinged to the part, B, their pieces in contact with each other constructed to receive and hold the metallic loop of rosettes, said die, A, being brought down upon the rosette in the lower die and uniting the loop thereto, as herein set forth for the purpose specified.

65,673.—ELASTIC FRAME FOR MOSQUITO BAR NETTING.—R. M. Holland and A. J. Hibbs, Philadelphia, Pa.

We claim the socket pieces, A A, with their enclosed springs, B, together supporting the stems, C C C C, elastically, in combination with the listing, D, or its equivalent for holding the musquito netting, E, the said parts being constructed and arranged to operate together substantially as and for the purpose described.

65,674.—COMPOSITION FOR HARDENING AND PRESERVING WOOD.—H. L. Houghton, Morrison, Ill.

I claim a wood preserving composition formed of the ingredients herein named and in about the proportions mentioned and applied to wood, substantially as herein described.

65,675.—QUARTZ MILLS.—W. W. Hubbell and J. M. Patton, Philadelphia, Pa.

We claim, First, The edged toothed sections or plates, p, firmly bolted and fitted to the rectangular surfaces or corners of the pot, and used in combination with the central revolving nuts, diminishing in their size and increasing in their number of teeth downward towards the bottom of the pot substantially as described.

Second, Discharging the ground quartz from the bottom of the pot, e, into the inclined conduit by means of the arm, n, attached to the rim or collar, m, and below the teeth, l, and plates, p, substantially as described.

Third, The series of circular movable toothed sections or nuts above each other vertically, the teeth of the separate nuts diminishing in size, but increasing in number as they are placed one below the other when used in combination with the interior vertical toothed plates, p, within the pot, constructed and operating substantially as described.

Fourth, The furrows in the stones cut in two distinct series, the inner series upon radial lines extending outward to or near the half diameter of the stone, the outer series in toward the centre, on lines tangential to the inner furrows, and entirely separate and distinct from each other, with a plain attrition or uncut face between them, substantially as described.

Fifth, In a mill for grinding quartz we claim the combination of the elevated pot, e, with its plates and nuts, arms, n, aperture, 22, inclined conduit, 1, and the lower stones, v z, constructed, proportioned and operating substantially as described.

Sixth, The removable steel cup or shoe, 19, constructed, applied and used between the vertical shaft and removable step, 21, in the manner and for this purpose as described.

65,676.—SCREW BOX FOR VISES.—A. Jameson, (assignor to himself, T. S. Murray, and J. H. Murray), Trenton, New Jersey.

I claim the method substantially as above described, of making screw boxes for vises.

65,677.—MODE OF DISINTEGRATING ROCKS.—John Johnson Saco, Maine, and R. C. Overton, New York City.

We claim liquid and gaseous hydro-carbon and air, or air and steam as fuel, for the purpose herein set forth, and when employed with the agents for the reduction of temperature substantially as specified.

65,678.—WRENCHES.—G. B. Keeler, Greenwich, Conn.

I claim the shank or bar, A, notched at one end, in combination with the adjustable spring hook, F, substantially as and for the purpose described.

65,679.—WRENCHES.—Dennis A. Kellogg, Valparaiso, Indiana.

I claim a wrench constructed, arranged and operating as and for the purpose herein set forth.

65,680.—CEMENT FOR FIXING DOOR KNOBS.—Patrick Kennedy, New York City.

I claim a cement composed of the ingredients substantially in the manner herein set forth.

65,681.—WAGON SPRINGS.—Garret C. Lansing and John G. Ostrom, Rhinebeck, N. Y.

We claim the flat wooden springs, a a' a'' a''', etc, when arranged in pairs, each pair at right angles across the other, substantially as and for the purpose herein shown and described.

65,682.—AUTOMATIC FIRE EXTINGUISHER.—Rufus Lapham, New York City.

I claim, First, The application of the expansion of mercury by the heat produced by the breaking out of a fire in a room to cause an alarm to be given.

Second, The application of the expansion of mercury by the heat produced by the breaking out of a fire in a room to cause chemicals that produce carbonic acid gas to be brought together for the purpose set forth.

Third, The application of the expansion of mercury by the heat produced by the breaking out of a fire in a room to cause a cock or its equivalent to open for the purpose of letting in an extinguisher agent kept in reserve.

Fourth, The application of the expansion of mercury by the heat produced by the breaking out of a fire in a room, to sever a wire or its equivalent with which mercury readily amalgamates for the purposes set forth.

Fifth, I claim generally for all purposes to which it is adapted, arranging a wire or its equivalent with which mercury readily amalgamates, in such a relation to the mercury that when expanded by heat it shall unite with said wire or its equivalent, and cause it to be separated.

65,683.—CARPET CLEANER.—Theodore Luke, St. Louis, Mo.

I claim the combination of the frame, b b, shaft, a, revolving arms, h, rotary brush, c, and windlass, k, as herein described and for the purpose specified.

65,684.—PUMPS.—Alexander Moon, Maquoketa, Iowa.

I claim the combination of the pumping cylinder or barrel, A, plunger, C, and tubes, D and J, when all constructed with valves and arranged together so as to operate substantially as and for the purpose described.

65,685.—SKATES.—H. C. Moore, (assignor to himself and Charles Robinson, Springfield, Mass.

I claim the hook notches, l l, in the adjacent edges of the flanches of the toe clamps in combination with the thumb screw, S, which holds the flanches together, substantially as and for the purpose specified.

I also claim the combination of the hook notches, f f, in the edges of the flanch of the heel clamp, the corresponding notched opening in the heel plate, D, the bolt, g, and nut, t, substantially as and for the purpose herein specified.

Also claim the notched eccentric, G, with its handle, p, turning up and down under the foot, and arranged so that it tightens more securely as the heel tends to work out, substantially as herein specified.

65,686.—CARPET STRETCHER AND HOLDER.—J. S. Mungen, Olean, N. Y.

I claim, First, The pointed dogs, B, adapted for use in the operation of stretching carpets, and constructed substantially as described.

Second, The combination of hooked holding plates, A, with curved dogs, B, substantially as described.

65,687.—SAWS.—James Neale, Trenton, N. J., assignor to himself and Mathew T. Higgins, New York City.

I claim a saw tooth formed with a dove-tailed base and grooved back setting wit in the recess of the saw plate, and secured by the clamping plate, D, within a recess at the front portion of the base of the tooth in the manner set forth.

65,688.—LINIMENT.—Rachel Newcomb, South Brooklyn, N. Y.

I claim the liniment made of the ingredients mixed together in and about the proportions herein above described.

65,689.—SLEIGH BELLS.—W. H. Nichols, East Hampton, Conn.

I claim casting a shank of two or more or less pins, a a, in and with the sleigh bell, A, substantially as and for the purposes herein shown and described.

65,690.—PUMPS.—Hiram Parks, Athens, N. Y.

I claim the arrangement of the pump, A, sinker, H, piston rod, B, crank or elbow pieces, C C, wires or rods, D, and lever, E, as herein described, operating as and for the purpose specified.

65,691.—KEEL, BLOCK, or REST.—Joseph Thomas Parlour, Brooklyn, N. Y.

First, I claim a block or support for the keel of a vessel, etc., when made in separate parts or sections, constructed and arranged together so as to be operated substantially as and for the purpose described.

Second, The upper or cap section, B, of a keel block, so arranged that as it is raised or lowered it will move and be guided in a vertical plane or direction substantially as described.

65,692.—ROLLING SCREEN FOR DOORS AND WINDOWS, ETC.—William G. Perkins, Walden, Vt.

I claim the winding screen made up of slats with edges as described when arranged on suspensories as specified.

65,693.—MEDICAL COMPOUND.—H. G. Pope and H. F. Herrick, New Berlin, N. Y.

We claim a medical compound made of the ingredients mixed together in and about the proportions, substantially as and for the purpose described.

65,694.—FENCE.—Esek C. Roberts, Salem, Mich.

I claim the combination of the top rails or riders, E, with the stakes, B and C, substantially in the manner herein shown and described and for the purpose set forth.

65,695.—POTATO PLANTER.—John P. Scudder, Lawrenceville, N. J.

First I claim the inclined cylinder, E, in combination with the revolving scoops, g, and adjustable valve, H, all made and operating substantially as herein shown and described.

Second, The hopper, N, and gate, h, in combination with the inclined cylinder, E, scoop, g, and valve, H, all made and operating substantially as herein shown and described.

Third, the adjustable plow, J, in combination with the inclined cylinder, scoops, g, and valve, H, all made and operating substantially as herein shown and described.

65,696.—LAMP EXTINGUISHER.—Edward Shaw, Portland, Maine.

I claim the curved extinguisher for lamp of the kind described when constructed and applied as and for the purposes set forth.

65,697.—STEAM ENGINE GOVERNOR.—J. W. Shirley and William H. Fasig, Terre Haute, Ind.

I claim the wind wheel, A, the shaft, B, and the spring, F', arranged and operating substantially as herein shown and described for the purposes set forth,

65,698.—LANTERN LAMP.—Jacob Silvins and William F. Hain, Sunbury, Penn.

We claim the crust remover, g, on the upper end of a vertical shaft, E, which passes through a tube, F, in the lamp, substantially as and for the purpose specified.

65,699.—APPARATUS FOR TEMPERING WIRE.—P. L. Slayton, (assignor to himself and Almet Reed), New York City.

First, I claim the radially adjustable strips or bars, E, arranged between the guide bars, C, and provided with holes or gas passages, c, communicating with recesses, e, in the guide bars, C, all arranged substantially in the manner as and for the purpose set forth.

Second, The central passage formed by the strips or bars, E, of such a size as to receive the wire to be tempered, and to permit a current of air to pass to the gas jets, and this I claim whether said strips, E, are adjustable or stationary.

65,700.—SLEIGH BRAKE.—William Sloan, Highland, Iowa.

First, I claim the jaws, E, pivoted to and straddling the runner, A, prong, G, and handle, F, when constructed and arranged as herein set forth for the purpose specified.

Second, Attaching an arm or prong, G, to the brake, E F, substantially as herein shown and described and for the purpose set forth.

65,701.—WINDOW SASH FASTENER.—Sherman Smith, Presque Isle, Maine.

I claim the combination of the bar, a a, the rack, c c, and the thumb screw, d, the wheel, g, on the plate, e, and the catch rod, f', arranged and operating as and for the purpose specified.

65,702.—SUGAR EVAPORATOR.—W. C. Smith, Warrensburg, Mo

I claim the pans, F G H, arranged at different hights on the body, A, of the device when used in combination with the flues, J J' J'', dampers, M M N O O, arranged relatively with the smoke-stack, K, and fire-box, B, substantially as and for the purpose set forth.

I further claim the adjustable wheels, C C, and folding legs or supports, D D, when used in combination with or applied to a sugar evaporator, substantially as and for the purpose specified.

65,703.—JIGGING MACHINE FOR DRESSING ORES.—William W. Spalding, Greenland, Mich.

First, I claim the main box, A, in combination with the plunger box, B, having a water passage or throat, a, connecting them, and divided into two compartments with the water passage, d, between them, and the discharge pipes, e e', leading from them, arranged and operating substantially as and for the purposes herein described.

Second, The plunger, C, pivoted or hinged at one side, in combination with the box, B, the main box, A, and the sieve, b, arranged and operating substantially as and for the purposes specified.

Third, The combination of the closed ragging box, E, attached to the front side of the main box, A, the self-regulating gate, p, and the guard, F, constructed, arranged and operating substantially as and for the purposes set forth.

Fourth, The rake, k, in combination with the counter shaft, l, the crank shaft, h, and the sieve, b, arranged and operating as and for the purpose described.

Fifth, The combination and arrangement of the main box, A, the plunger box, B, the plunger, C, the bail, g, the apron, D, the rake, k, the guard, F, the gate, p, and the ragging box, E, substantially as and for the purposes herein described.

65,704.—BREECH LOADING FIRE-ARM.—R. E. Stephens, Owen Sound, Canada.

I claim, First, The construction and manner of operation in a breech-loading fire arm of the hammer, C, in combination with the cam rod, G, working by the double link, M.

Second, The construction of the extractor in two parts or sections, E F, in combination with the cam rod and springs, J S and X.

Third, The combination of the latch, O, and its operation automatically, and by the spring, x, and cam rod.

Fourth, The tripping box, I, and its notched key, H, operating therein in combination with the cam rod.

Fifth, The cam, F, in combination with the spiral shaped shoulder Q, on the connecting rod, R, and working by the cam rod, in combination with the double link and hammer or its equivalent.

Sixth, The combination of the connecting rod, R, with the thumb bit, D, and breech block, A, and the spiral springs, J S and X, operating substantially as described and for the purpose set forth.

65,705.—APPARATUS FOR TREATING AIR AND HYDRO-CARBON VAPOR FOR ILLUMINATING GAS.—Levi Stevens, Fitchburg, Mass

I claim the apparatus for treating air and hydro carbon vapor for illuminating gas, substantially as described and for the purposes specified.

Also I claim the combination of the float, k k, with the rod, a, and head, c arranged substantially as described and for the purposes set forth.

Also I claim the use of alcohol for improving the quality of gas for combustion, in combination with the use of lime, substantially as described and for the purposes set forth.

65,706.—TACK HAMMER.—Thomas B. Stout, Keyport, N. J.

I claim the arrangement of the hammer head oblique to the handle, substantially as and for the purpose herein specified.

I also claim the claws arranged on the front side of the hammer head at the upper end thereof, and in line parallel with the handle, in combination with the oblique arrangement of the head and handle for the purpose set forth.

I also claim the combination of the oblique head and handle and magnetized claws, substantially as herein specified.

65,707.—FARM GATE.—John G. Talbot, Sloansville, N. Y.

I claim the single post, F, provided with the eye or socket, E D, and hook, J, and suspended roller or pulley, I, in combination with the gate, A B, the several parts being arranged and operating as and for the purpose set forth.

65,708.—BUTTON FASTENING.—John K. Underhill, Brooklyn, N. Y.

I claim the button, A, plate, B, and slotted plate, C, when the same are connected and combined with each other, and made and operating substantially as and for the purposes herein shown and described.

65,709.—PLOW.—F. Volkman, Hoboken, N. J.

First, I claim securing the upright screw shaft, D, in the axle, A, in the manner set forth, and clamping it by means of a set screw, a', and clamp, E, substantially as herein shown and described.

Second, The link, J, when arranged laterally adjustable on the plow beam substantially as herein shown and described, and for the purpose of changing the draft of the chain, I.

Third, The adjustable draft bar, G, when secured by a bolt, l, to the solid axle, A, and when connected with the draft chain, I, substantially as set forth.

Fourth, Securing the front end of the plow beam to a vertical rod, D, which projects from the axle of a cart, substantially as herein shown and described, the said rod not being secured or supported in any frame or other device that is arranged above the axle, A, and in contact with the same, substantially as set forth, and for the purpose of making the whole cart lighter and of simpler construction.

65,710.—BURGLAR ALARM.—Isaac M. Wells (assignor to himself and William Wood), Jeffersonville, Ohio.

First, I claim the post or shaft, B, wheel or disk, H, with cords, J, operating to free the verge wheel, M, as and for the purpose stated.

Third, In combination with the shaft, B, disk, H, cords, J, and pivoted lever, K, I claim the pin or pins, E, allowing the cords, G, to be self-detaching when they have performed their duty of starting the alarm.

65,711.—STOP MOTION FOR STEAM ENGINES.—Charles S. Westland, Providence, R. I.

First, I claim the combination of the air chamber, B, pipe, C, regulating cylinder, A, containing the piston, D, and spiral spring, E, piston rod, F with or without the sliding stop, c, and graduations, steam pipe, G, containing the valve, H, lever, J, double-slotted graduated arm, K, holding the adjustable index, a, and pipe, m, substantially as described for the purpose specified.

Second, The arrangement of the spring on the cylinder, communicating action to the piston by a ratchet wheel and pawl, as shown in Fig. 5, said ratchet wheel held in position by a dog, substantially as described and for the purpose specified.

65,712.—SKY LIGHT.—Horace Weston, Boston, Mass.

I claim forming grooves or gutters, a c, in the bars, B, and at the sides of the sash, substantially as and for the purpose described.

I also claim so forming or cutting away the upper surface of the bottom rail, D, that the moisture will run down into the grooves, a c, substantially as set forth.

65,713.—WASHING MACHINE.—E. F. Wheeler, Sag Harbor, N. Y.

I claim the slide, D, having prongs or fingers, E, projecting downward from its lower part, and rack teeth upon its upper part, in combination with the cover, C, lever, G, and box or tub, A, substantially as herein shown and described and for the purpose set forth.

65,714.—EVAPORATOR.—Samuel M. Williams, Pine Village, Ind.

First, I claim an improved evaporator formed by the combination of the pans, C D and E, with the furnace, A, when said furnace is constructed and arranged substantially as herein described and for the purposes set forth.

Second, The skimmer, F, formed by the combination of the perforated or wire-gauze plate, f', the handle, f3, and the sliding rod, f4, substantially as described and for the purpose set forth.

65,715.—DEVICE FOR CLEANING THE TRAPS OF WATER CLOSETS.—James Wright (assignor to himself and Francis Blessing), New York City.

First, I claim the flexible rod, E, when made as described, in combination with the tubular guide, B, and inflexible handle, C D, all made and operating substantially as and for the purpose herein shown and described.

Second, The friction rollers, F, in combination with the links, E, of the flexible rod, and with the handle, C D, all made and operating substantially as herein shown and described.

65,716.—GRAIN SEPARATOR.—A. J. Alexander, Chicago, Ill.

I claim winding the cylinder, C, with wire in spiral form, leaving the intervals between the threads of wire somewhat less than the transverse diameter of the grade of grain to be passed through said cylinder, substantially as and for the purpose herein specified.

65,717.—BUTT HINGE.—Mason C. Ames, Hartford, Conn.

I claim the arrangement of the hinge joint, b, in its relative position with the plates, a' a, substantially as and for the purpose described.

65,718.—PUMP.—Charles Bemis, Mishawaka, Ind.

I claim the arrangement herein set forth of the cylinders, B B', with their piston heads and rods, the pipes, D and H, with their valves, and the slotted lever, E, with its crank, all constructed and used with the boxes, A A2, as and for the purpose herein specified.

65,719.—CULTIVATOR.—Joseph C. Bird, Rising Sun, Md.

First, I claim the arrangement of the share frame, E, supported from the lever, H H', and pivoted frame, I p, in such a manner as to lift vertically or independently, as described.

Second, The trapezoid-shaped cultivator frame, consisting of the portions, a a a b b c c, arranged substantially as described.

Third, The share, e, formed double without a weld, pinched in at the center to embrace the standard, F, and with flaring ends, in combination with the stirrup brace, substantially as represented in Fig. 4.

65,720.—HYDRAULIC WEIGHING APPARATUS.—Louis Braner, Memphis, Tenn.

First, I claim a wheel which is provided with buckets or chambers upon its circumference, and also with a continuously acting counterbalance, and which is adapted for weighing, substantially as described.

Second, The combination of a registering or recording mechanism, with a continuously rotating weighing apparatus, operating substantially as described.

Third, Sustaining a rotary weighing wheel, which is provided with a continuously acting counterbalance upon anti-friction rollers at both ends of its axle, and connecting such wheel directly to the registering mechanism, substantially as described.

Fourth, The case, I, adapted for receiving the registering mechanism when it extends from the face plate of the wheel case, A, into the space surrounding the center of the weighing wheel, all constructed and arranged substantially as described.

Fifth, The trap, K, and overflow, l, substantially as described and shown, for conducting the fluid to be weighed upon the weighing wheel and into the buckets thereof, substantially as described.

Sixth, The arrangement of the receiving chamber below the wheel case, A, substantially as and for the purpose described.

Seventh, The sample chamber, F, with the outlet, F', and a valve, t, substantially as and for the purposes described.

Eighth, The hydrometer receiver or receivers, for the purpose specified.

65,721.—SLIDE FOR SAFETY REINS.—Frank W. Brooks, Washington, D. C.

First, I claim a metallic slide, which is adapted for being attached to the safety lines, A, of the reins, B, and which is provided with a ring or loop, c, substantially as and for the purposes described.

Second, The construction of an arresting hook upon the sliding portion, a, substantially as described.

65,722.—MATCH SAFE.—Charles Bunger, New Haven, Conn.

I claim the match safe constructed substantially as herein described, provided with an inclined bottom, B, and the trough, D, into which an opening through the front permits a single match to enter the said trough, and constructed so as to remove the match from the said trough, substantially as and for the purpose specified.

65,723.—BLANK FOR CALKS OF HORSE SHOES.—R. B. Caswell, Palmer, Mass.

I claim, as a new article of manufacture, bars of steel formed for toe calks, substantially in the manner herein described.

65,724.—STUMP EXTRACTOR.—George Chamberlin, Olean, N. Y.

First, I claim the metal cap flange or head, as constructed, having a concave socket, into which is fitted a concave washer to reduce the friction and allow changing the position of the line of draft on the screw, in the manner and for the purposes herein described.

Second, I claim the flange cap, C, and socket concave washer, E, in combination with the rotating screw box or nut, F, and lever sweep, K, substantially as and for the purposes set forth.

Third, I claim the construction of the cast-iron double-headed screw, with its wrought-iron central supporting rod to give strength and durability, as described.

Fourth, I claim the screw rod, H, hand wheel, k, and double-hooked

swivel, j j, in combination with the main screw, D, for taking up the slack in hitching, as specified.

Fifth, I claim supporting the lever sweep, G, on the rim of the flange cap, C, so that it will operate substantially as and for the purposes herein set forth.

65,725.—CORN PLOW.—John M. Clark, Somerville, Ohio.

First, I claim the adjustable cross braces, B B, connected with the rear end of the beam, D, in combination with the standards, A A, constructed, arranged, and operating conjointly in the manner and for the purpose specified.

Second, The combination of the ratchet and latch represented in Fig. 5, with the adjustable link, j, and draw bars, l l, arranged in the manner and for the purpose described.

Third, The guard o, and detent m, in combination with the tongue k, bars a', and wooden pin, n, arranged and operating substantially as and for the purpose described.

Fourth, The construction of the plows of a single sheet of metal in the manner represented in Fig. 3, for the purpose described.

65,726.—COMBINED LEVEL AND PLUMB.—Patrick Clifford, Holyoke, Mass.

I claim the spindle, D, passing through the stock, M, having secured to it at one end the case A, its other end bearing the index I, on its conical part, and tightening nut, S, all constructed and arranged substantially as herein described and set forth.

65,727.—CANT HOOK.—William S. Colburn, Loami, Ill.

I claim the cant hook consisting of the forked slide, D, bolt, C, hook, B, and lever, A, constructed and operating in the manner herein described.

65,728.—HORSE SHOE.—George W. Cooper (assignor to himself and James V. Jones), Ogeechee, Ga.

First, I claim a plow or horse hoe of four separate sections, viz.: base A, center plate B, and shares C C, constructed and arranged substantially as described and for the purpose specified.

Second, I claim the shoulders a a, formed in the opposite sides of the plate, B, substantially as described and for the purpose specified.

Third, I claim the metallic sole D, secured to the base plate A, for regulating the depth of the furrow, substantially as described.

65,729.—LENS FOR PHOTOGRAPHIC PORTRAITURE.—J. H. Dallmeyer, London, England.

I claim the construction of lenses or objectives suitable for photographic purposes, the component parts of which are of such form and so positioned that by a slight variation of distance between the lenses of one of the combinations, as by means of a screw movement, the operator can produce at will any desired amount of spherical aberrations or diffusion of focus, without at the same time materially deranging the other necessary corrections of photographic lens, substantially as herein described.

I also claim the combining lenses, a a' b b', substantially as herein described.

65,730.—ARTICLES OF PAPER WEARING APPAREL.—George W. Day, Charlestown, Mass.

I claim, as an article of manufacture, paper either plain or enameled, embossed or imprinted by means of a woven fabric applied to its surface under pressure, either before or after its conversion into articles of wearing, applied substantially as set forth.

65,731.—BED BOTTOM.—George H. Dow, Freeport, Ill.

I claim the arrangement of the sectional rubber springs, G H, between the single slats, E I and J, forming a vertical series held together by the straps K, constituting the bed bottom, in the manner described.

65,732.—HARVESTER.—Matthew Easterbrook, Jr., Geneva, N. Y.

I claim the arrangement of the two loose pinions f and g, on the crank shaft, C, in combination with the bevel, having two sets of teeth b and d, when the said pinions are locked to the shaft by a clutch or clutches, substantially as herein shown and described and for the purposes set forth.

65,733.—PROCESS OF MANUFACTURING ILLUMINATING GAS.—William Elmer, New York City.

First, I claim the construction of a tube attached to the mouth piece of each retort, and terminating in a gas-tight rotary supply valve, through which coal or other material for generating inflammable gases is introduced out of contact with the atmosphere into the retorts, and moved forward by means of a receiver and slide situated within the mouth piece, substantially as set forth, and this I claim whether accomplished by a rotary valve or otherwise.

Second, I also claim the construction of an outlet tube from the further or back end of each retort, the end of which tube is sealed by dipping into a reservoir of coal tar or other suitable substance, so as to exclude the air from entering the retorts and to prevent the escape of the gases generated in the retorts, by which the coke is discharged without opening the retorts, substantially as above set forth.

Third, I claim the method of subjecting the gas material within the retorts in a gradual manner to the heat, and as the process advances and the volatile products are given off, the gas material is moved forward until brought in contact with the highest heat where it is converted into gases, substantially as above set forth; and this I claim whether the coal or other material employed in gas making is conveyed into the retorts in the precise manner described by me or otherwise.

Fourth, I further claim the application of a current of electricity introduced into the retorts for the purpose of decomposing the aqueous vapor formed in the process of gas making, and also for the purpose of inducing the chemical affinities of certain elementary bodies present, by which a gaseous compound is formed, as above described.

Fifth, I further claim the combination of the gas-making retort with an electric battery, excited either by heat or by chemical solutions, substantially as above described.

65,734.—LUBRICATOR.—Joseph Fanyou, Bridgeport, Conn.

I claim the combination, as described, of the cup and the transverse bar with the screwed spindle and regulating nut.

65,735.—CLOTHES DRYER AND STAND COMBINED.—George Farmger, Pittsford, Mich.

I claim the cover D, provided with its hooks E E, for holding the frame as constructed in the desired position, and forming a stand for the clothes when combined and used for the purposes specified.

65,736.—COAL SIFTER.—John S. Fifield, Westerly, R. I.

I claim the arangement of the box A, with wheel E, as constructed, sieve H, spout D, and drawer C, in the manner and for the purposes substantially as set forth.

65,737.—MOP WRINGER.—W. W. Finch, Mishawaka, Ind.

I claim the forked bar E, upon the end of the rod, D, used in combination with the frame, A, contracted at the end in the manner and for the purposes specified.

65,738.—SORGHUM EVAPORATOR.—Addison L. Folger, Sumner, Ind.

First, I claim the combination of the furnace A, having a longitudinal partition, A3, the transverse overhung pans E E1 E2, and longitudinal pans, M and N, substantially as described.

Second, The furnace, A, constructed with double flues, A1 and A2, which are independently regulated by means of the dampers, C and D, arranged to operate in relation to the pans, M and N, substantially as described.

Third, The arrangement of the pans, E E1 E2, gates, F, screen, G, lever, I rod, K, nut, K', and springs, L, substantially as described.

Fourth, The arrangement of the transverse and longitudinal pan with flanges, H H, intermediate plate, H', and gates, F, and screens, G, substantially as set forth.

65,739.—PARLOR TEN-PIN ALLEY.—Charles H. Fowler, West Roxbury, Mass.

I claim the application and arrangement of the trap floor, f, in such manner that it shall be lowered simultaneously with the act of raising the pins, and returned to place when such act has been accomplished, essentially in manner and for the purpose as set forth.

I also claim the mechanism for operating the pins and trap floor, consisting of the cords, n n n, etc., block and wedge, v and c, ropes, w g a' and b', pulley, l, and spring, d', combining and operating together to produce the effects substantially as before described.

65,740.—STEERING INDICATOR.—Nicolai C. Franzen, Hamburg, Germany.

First, I claim the combination with the rudder of steering gear of vessels of a dial plate and index, or their equivalents, so connected with the steering apparatus that any movement of the rudder will be indicated on such dial when such dial and index or indicator are so placed in respect to the deck of the vessel as to be plainly visible from different parts of the vessel, for the purposes set forth.

Second, The combination and arrangement in such an indicator, when so located, with the steering gear of a vessel, of an index moving over a dial, such index and dial being of strong contrasting colors to indicate by day the position and movement of the rudder, substantially as and for the purposes set forth.

Third, The combination and arrangement in such an indicator, so located and connected with the steering gear, of plates of differently colored glass or other transparent material, with a movable opaque plate or surface, having a suitable aperture cut therein, and with a light or lamp, arranged and combined substantially as described to indicate at night, by differently colored lights, the position and movements of the rudder for the purposes set forth.

Fourth, The combination in one and the same indicator of an index moving over a differently colored surface, or their equivalents, and of colored transparent plates in connection with a movable opaque, perforated plate and with any light, the several parts arranged and operating severally and in combination substantially as described, thereby rendering the same instrument either a day or night indicator of the movements of the rudder, for the purposes set forth.

65,741.—METAL BARREL.—John A. Frey, New York City.

First, I claim strengthening and protecting metallic barrels, by making their hoops of wood, substantially in the manner and for the purpose described.

Second, The mode herein set forth of placing the end hoops to secure the chimes from indentations, and also the mode of securing the end hoops in place by swaging out the chimes, substantially in the manner and for the purpose set forth.

65,742.—MAGAZINE REVOLVING FIRE-ARM.—Edward J. Frost, New York City.

First, I claim the pawl, K, in combination with the magazine spring, e, as and for the purpose set forth.

Second, The plunger, h, spiral spring, h', and thumb catch, h2, arranged for engaging with the hammer, substantially as explained.

65,743.—METHOD OF UNLOADING RAILROAD CARS.—Ferdinand Haase and William Rost, Oak Park, Ill.

First, We claim the folding platform, A, constructed and operating substantially as set forth.

Second, The pulley, E F F, rod, g', and chains, G G, in combination with plates, H H, lever, I I, cog-wheels, K K, and the drum, O, of the brake, the whole arranged so as to bring down the cog-wheels, K K, when desirable, and mesh their teeth into the teeth of the pinions, R R, of the car-axle, substantially as herein described and specified.

Third, The pinions, R R, set on the car-axles, in combination with the described device to automatically unload the folding platform, A, substantially as set forth.

Fourth, The device to gradually fold the platform, A, consisting of brackets, l l and m n, rods, v v, ratchet wheel, p, and lever, q, constructed as described, the whole arranged and operating substantially as herein described and for the purpose specified.

Fifth, The plates, T T, hinged to the car frame to raise the platform, B B, in combination with the said platform, substantially as described and specified.

65,744.—SCALE RULE.—William Hay, Dumbarton, Scotland, assignor to Robert Hay, Mineral Point, Wis.

First, I claim providing a rule with a fixed scale, b b, indicating the circumference of circles arranged in relation with the ordinary measuring scale, a a, substantially as herein set forth for the purpose specified.

Second, Providing a rule with a chord scale, a c, arranged in combination with the radius scales, d d, substantially as herein set forth for the purpose specified.

Third, Providing a rule with the scale, c c, arranged in relation with the radius scales, d d, substantially as herein set forth for the purpose specified.

Fourth, The construction of a rule with the scales, b b c c d d and e e, arranged in relation with each other and with the scale of inches or other measurement, substantially as herein set forth for the purpose specified.

65,745.—DEVICE FOR SHEARING METALS.—John E. Heath, Niles, Mich.

I claim the racks, E G P, and pinions, F H, provided with the handles, N N, constructed and combined substantially as set forth.

The set screw, O, in combination with the arms, A B, provided with racks, E G P, and pinions, for the purpose of limiting the movement of the arms away from each other and the movement of the operative lever.

The slotted cutters, J J, in combination with the screw, L L, set screw, M M, and jaws, A B, substantially as and for the purpose set forth.

65,746.—GRAIN BINDER.—Solomon T. Holly, Rockford, Ill.

First, I claim the arrangement in binding apparatus of the band-securing instrument and compressing strap-holder at opposite sides of the ring-carrier, substantially as set forth.

Second, I also claim the combination in binding apparatus of the jaws of the cord-holder with a shear blade, substantially as set forth.

Third, I also claim a cord-twister for binding apparatus, composed of an arbor and jaws, one of which is movable toward and from the other in the direction of the length of the arbor, substantially as set forth.

Fourth, I also claim the combination in binding apparatus of the following instrumentalities, viz.: the ring-carrier, driving shaft thereof, band-securing instrument and connecting and disconnecting mechanism, all operating in the combination, substantially as set forth.

Fifth, I also claim the combination in binding apparatus of the following instrumentalities, viz.: the band-securing instrument, ring-carrier, gearing ring and connecting and disconnecting mechanism, all operating in the combination substantially as set forth.

Sixth, I also claim the combination in binding apparatus of the following instrumentalities, viz.: the band-securing instrument and gearing-ring, the latter operating the former substantially as set forth.

Seventh, I also claim the combination in binding apparatus of the following instrumentalities, viz.: a detachable strap-holder, detent therefor, gearing-ring and ring-carrier, all operating in the combination substantially as set forth.

Eighth, I also claim the combination in binding apparatus of the following instrumentalities, viz.: a detachable strap-holder, detent therefor, ring-carrier, and driving shaft therefor, all operating in the combination substantially as set forth.

Ninth, I also claim the combination in binding apparatus of the following instrumentalities, viz.: the appurtenance of the band-securing instrument, gearing-ring and ring-carrier, all operating in the combination substantially as set forth.

Tenth, I also claim the combination in binding apparatus of the following instrumentalities, viz.: the appurtenance of the band-securing instrument, ring-carrier and driving shaft thereof, all operating in the combination substantially as set forth.

Eleventh, I also claim the combination in binding apparatus of the following instrumentalities, viz.: the latch of the connecting mechanism of the ring-carrier and band-securing instrument, the former operating upon the latter substantially as set forth.

Twelfth, I also claim the combination in the binding apparatus of the following instrumentalities, viz.: the gearing-ring, the detent of a detachable strap-holder, the detachable strap-holder, ring-carrier and connecting and disconnecting mechanism, all operating in the combination substantially as set forth.

Thirteenth, I also claim the combination of a stop mechanism of a ring-carrier and the cord-holder of binding apparatus in such manner that the first instrumentality operates the second substantially as set forth.

Fourteenth, I also claim the combination of the stop mechanism of a ring-carrier and the shear-blade of a binding apparatus, substantially as set forth.

Fifteenth, I also claim the combination of the stop-latches of the ring-carrier of a binding apparatus with a stop formed of parts, one of which is movable, the whole operating substantially as set forth.

Sixteenth, I also claim the combination of the movable jaw of the band-securing instrument of a binding apparatus with a hand lever, so that it may be readily opened, substantially as set forth.

Seventeenth, I also claim the guide for the binding material, consisting substantially of a V-formed instrument and gate, substantially as set forth.

Eighteenth, I also claim the combination in binding apparatus of the tongue that retains the binding material in the track of the movable instrument that is to seize it, with the driving shaft of the apparatus, through the intervention of a cam, substantially as set forth.

Nineteenth, I also claim the combination of the tongue that retains the binding material with the cord-carrier, in such manner that the former may be moved laterally to the track of the binding material to remove it from its path at one period and to insert it in its path at another in the operation of binding, substantially as set forth.

65,747.—STEM WINDING WATCH.—Edwin B. Horn, Boston, Mass.

First, I claim the ring gear D, when arranged in combination with the face of a watch, substantially as described and for the purpose set forth.

Second, I claim the auxiliary stem L L, passing through the centre of the winding stem A, substantially as described and for the purpose set forth.

Third, I claim the combination as well as the arrangement of the auxiliary stem L, with the gear wheel K K, and the lever M M, substantially as described and for the purpose set forth.

65,748.—CALENDAR CLOCK.—Henry B. Horton and M. L. Wood, (assignors to the Ithaca Calendar Clock Company), Ithaca, N. Y.

First, We claim the interposition of the connecting devices made as described, between any convenient part of the time movement and of the calendar, and all equivalent therefor, when so constructed that the calendar can be tested or proven, with or without motion, of the time movement or any portion thereof, the said devices being applied to any part or point of the time movement or connected therewith, for the purpose of testing by machinery the calendar, when substantially made as and accomplishing what has been described.

Second, We claim a changeable or self-adjusting fixture on or connected with the shaft of the twenty-four hour wheel, as specifically shown by the use of the wedge G, pin H through the tube, E, and shaft, F, and also at I, as set forth.

Third, We claim broadly the employment of the mechanism described or any equivalent thereunto, by which one or more calendars are tested or proven, after the clock and calendar, or clocks and calendars are completed, and further we claim broadly the machinery by which one or more calendars are tested or proven, whether the calendar or calendars are connected with the time movement or not.

Fourth, We claim specifically the employment of the crank or cranks, O, or other conveniently made equivalent with the rod or rods, D, or other equivalent, by which the time calendar cams, A, of separate clocks are moved, for the purpose of testing or proving them by machinery, as described.

Fifth, We claim broadly arranging and making a suitable machine or mechanism, for the purpose or applying to and removing from the same in any convenient manner, one or more calendar clocks, either in a finished or the calendar or any of its parts or of any part or portion of the time movement necessary to the connection of the time movement and calendar, when substantially accomplishing the end or object we desire or have described.

Sixth, We claim so arranging a series of calendar clocks, and also of calendars only, in connection with air test line or mechanism, that the changes of months, days of the month and days of the week or other appropriate changes of calendar clocks, are made simultaneously or nearly so, through the whole line or series, for the purpose of mutually proving or testing each other, thus making apparent any defect of construction or operation in any one or more of them, as described.

Seventh, The claim testing calendar clocks, by applying to or actuating their movements by a propelling or driving mechanism, in such a way that these movements may be accelerated to the extent and purpose set forth in this specification, using therefor such propelling machinery as is herein set forth, or any equivalent therefor, and the interposition of the connecting devices set forth, or any equivalent therefor.

65,749.—BUCKLE.—G. C. Huntress, Elkhorn, Wis.

I claim a buckle consisting of the frame, D, having the cross-bar, F, and tongue, A, formed thereon, and having the lever, C, with the tongue, B, attached, pivoted to the frame as herein described.

65,750.—TEETH FOR LIFTING LODGED GRAIN.—William Marcus Jackson, Woodland, Cal.

I claim the elastic shoes in combination with the yielding fingers applied to a section or frame to be attached to a reaper, and all arranged to operate in the manner substantially as and for the purpose set forth.

65,751.—SYRUP STRAINER.—W. E. Jacobs, Columbus, Ohio.

I claim a straining apparatus, which consists of a box, A, having a division B, and strainer, C, applied within it, in such manner that the liquid to be strained shall pass upward through the strainer, substantially as described.

65,752.—PRESSES.—Gilbert D. Jones, New York.

First, I claim in combination with the follower of a press, three toggles, arranged relatively to each other and pivoted to the follower in the relation to each other substantially as set forth, the combination being substantially as described and operating substantially as set forth.

Second, In combination with three toggles, I claim cogged sectors attached and gearing together, substantially as described, whereby the three toggles may be made to move in unison as set forth.

Third, In combination with three toggles and their cogged sectors, I claim a sector in gear with a screw, the combination substantially as described and operating substantially as set forth.

Fourth, In combination with two sets of toggles to operate followers in opposite directions, I claim right and left hand screws mounted upon the same shaft, the combination being and acting substantially as set forth.

65,753.—ENGINE PISTON.—Washington Keemle, Philadelphia, Pa.

First, I claim the combination and arrangement of the central tube, C, with the packing, by means of the crown wheel, G, pinions, F F' F', and nuts E E' E', substantially in the manner described and for the purpose specified.

Second, The combination of the pinion, P, with the follower-ring, H, and with the wheel, L, by means of the pinion, M, and pawl, O, substantially as described and for the purpose set forth.

Third, Constructing the screw thread of the rod, D, of coarser pitch than those of the rod, D D, substantially as described and for the purpose specified.

65,754.—INDIA RUBBER TREAD FOR CARRIAGE STEPS.—Geo. Augustus Keene, Newburyport, Mass.

I claim the arrangement and combination of the plate, f, in connection with and securely fastened to the rubber tread, consisting of reticulated ridges, b and c, and intaglio cells, a and d, to form a tread for a carriage step substantially as described.

65,755.—CORN PLANTER.—Geo. W. Knapp, Corning, N. Y.

First, I claim the adjustable revolving arms, D D, constructed and operating as described and for the purposes set forth.

Second, The revolving wheel K and feed buckets, c c c c, constructed and operating as described, and for the purposes set forth.

Third, The automatic valves, P P, as described, and for the purposes set forth.

Fourth, The automatic scrapers, q q, constructed and operating as described and for the purposes set forth.

Fifth, The treadle levers, 2 and 3, with levers, 2 2, for elevating the arms D D D, &c., the furrowers L L, the valves, P P, and scrapers q q, constructed and operating as described and for the purposes set forth.

Sixth, The combination of the arms, D D, &c., with the feed wheel, k, revolving feed buckets, c c c, &c., and the valves, P P, the whole constructed and operating as described and for the purposes set forth.

Seventh, The furrows, L L, and the manner, herein described, of attaching and detaching the furrowers, holding them firmly, or allowing them to revolve by means of the devices herein described and set forth.

65,756.—SLED BRAKE.—Herman E. Knapp, Benson, Vt.

I claim the levers, d d, in combination with the rods, f f e e, lever, A, rod, G, and lever, C, all acting in combination with the double claw arms, B, or their equivalents, the whole combined as specified and for the purpose set forth.

65,757.—LIFTER FOR THE LIDS OF PITCHERS.—F. W. L. Knueschke (assignor to the Gorham Manufacturing Co.), Providence, R. I.

I claim the lifter or lever, in combination with the handle and hinged lid of a pitcher or other vessel, substantially as described for the purpose specified.

65,758.—HOSE COUPLING.—Silas H. Lornig, Lawrence, Mass.

I claim the ring, C, within the end of the hose, D, in combination with the annular clamping ring, E, and flange socket, B, the flange, A, or projecting end, b, all arranged substantially as and for the purpose set forth.

65,759.—FERRULE FOR TUBULAR BOILERS.—David Matthew, Prairie du Chein, Wis.

First, I claim the projecting ferrules, B, constructed and arrangad as and for the purpose herein set forth.

Second, I claim the ring, D, combined with the projecting ferrules in front of the flue sheet to protect it, as set forth.

65,760.—DIVING APPARATUS.—Thomas Cato McKeen, Irvington, N. J., assignor to the New York Submarine Co.

I claim the use and application of hoops or rings to the diving dress, constructed and operating in the manner and for the purposes described.

65,761.—JOINT FOR CARRIAGE BRACES.—F. B. Morse, New Haven, Ct. Antedated May 21, 1867.

I claim the cone, D, formed upon an inverted conical ear, C, on the one part, combined with a corresponding ear, E, provided with an internal conical seat upon the other part to correspond to the cone, D, the whole constructed substantially as herein set forth.

65,762.—METHOD OF MANUFACTURING SHACKLES FOR CARRIAGE THILLS.—F. B. Morse, New Haven, Ct.

I claim the method, herein described, of forming the square-backed shackle blank, described and represented by fig. 8.

65,763.—WATER ELEVATOR.—Greshom Molt, Big Run, Ohio.

I claim the arrangement of the chain, D, provided on its inside with buckets, E, with the wheel, B, having arms, C C, and trough, F, substantially as and for the purpose herein set forth.

65,764.—TOY TORPEDO AND EXPLOSIVE COMPOUND.—Chas. Nelson (assignor to himself and Louis Klueber), New York City.

First, I claim the toy torpedo, herein described, having a body molded in the form required, and composed of materials in the proportions, which shall be harmless in exploding, substantially as herein specified.

Second, I claim, as an explosive composition for torpedoes and analogous uses, the compound herein described, composed of materials in the proportions, substantially as herein specified.

65,765.—WINNOWING SCREEN.—H. Ogborn, Richmond, Ind.

First, I claim the apparatus for giving an upward direction to the fan-blast, consisting of the pivoted guide plates, F', provided with rods, G, in combination with the notched plates, F, substantially as described and for the purposes specified.

Second, The guide plates, F', and notched plates, F, in combination with the screens, L and H, substantially as and for the purposes set forth.

Third, The L-shaped lever, R, rods, I and S, pinion, C, on the fan shaft and gear wheel, B, in combination with the screens, L and H, arranged substantially as described.

Fourth, In combination with the above, the adjustable slide, o, and pivoted lever, T, substantially as and for the purposes set forth.

65,766.—METHOD OF ATTACHING METAL SOLES TO BOOTS AND SHOES.—Homer Riggs, Washington, D. C.

I claim securing taps or oversoles of sheet metal or other suitable material to the bottom of boots and shoes by making slotted holes, d d, in the ears, a a and also in the rear end of the tap, A, to be sprung over the screw heads, e e, so that the taps may be removed and replaced by the wearer at pleasure substantially as and for the purposes herein set forth.

65,767.—APPARATUS FOR DRYING HIDES, LEATHER, ETC.—A. W. Roberts (assignor to P. Jewell & Sons), Hartford, Ct.

I claim driving the air through heating tubes, A, arranged in a heating chamber, B, into a drying apartment, G, substantially as and for the purpose described.

65,768.—EMBROIDERING ATTACHMENT FOR SEWING MACHINES.—Israel M. Rose (assignor to the Sewing Machine Improvement Co.), New York City.

I claim, First, The combination of the frame, B, spring, C, and point, d, with the vibrating arm or lever, D, constructed and arranged substantially as above set forth for laying the embroidery thread or twist in proper position as described.

Second, I claim a spring, C, having a spring point, d, as shown in combination with the vibrating arm, D, substantially as and for the purpose set forth.

65,769.—WINDING AND SETTING WATCHES.—Henry Rothfelder, New York City.

I claim the pawl carrier, r, located between the usual ratchet wheel on the arbor of the spring barrel and the ratchet wheel, t, and receiving motion from the wheel, n, pinion, l, and burr, d, for winding the watch as set forth.

I also claim the setting wheel, u, provided with long teeth and set upon the levers, v, in the manner specified, in combination with the wheel, n, pinion, z, and connection to the burr, d, as and for the purpose set forth.

65,770.—STOVE PIPE DRUM.—Charles E. Rapell, Jacksonville, Ill.

I claim arrangement of the annular radiator, A, and pipe, B, provided with its tubes, D E, and conical pipe, C, in the manner substantially as and for the purposes set forth.

65,771.—CORN PLANTER.—James P. Lelsor, Cherry Box, Mo.

I claim the employment of the ratchet, D, substantially in the manner herein described and set forth.

I also claim the combination and arrangement of the wheel, A', and the ratchet, D, the lever, C C1, and the spring, C2.

65,772.—BRICK KILN.—William A. Shephard, New York City.

First, I claim an oblong building with a railroad track running through its whole length and divided into separate compartments by means of removable partitions in combination with a series of cars having fire brick or their equivalent platforms and adapted to building kilns thereon, and burning the same on the cars, substantially as described.

Second, I also claim building and burning kilns of brick, pottery or other similar substances on movable railroad cars with platforms of fire brick or equivalent material, substantially as described.

65,773.—DOOR AND BIT FOR BOILING AND PUDDLING FURNACES.—William Sims, Pittsburgh, Pa.

I claim an improved door and a new bit to be fastened thereon for puddling or boiling furnaces or all other furnaces, subject to intense heat.

65,774.—PRIMING METALLIC CARTRIDGES.—Dexter Smith, Springfield, Mass.

I claim a center fire cartridge in which the anvil is attached to the interior of the head of the cartridge shell by means of the flange, a, formed on the inside surface of the same, substantially as described.

65,775.—LIGHTNING RODS.—Charles Stearns, Lowell, Mass., assignor to Jacob A. Kissell, Chicago, Ill., who assigns one-half of his right to Nathan Blickensderfer, Erie county, Pa.

I claim a lightning rod or conductor consisting of a solidly continuous strip of sheet metal, substantially as described.

65,773.—FASTENING FOR NECK TIES.—William J. Terry, Walla Walla, Washington Territory.

First, I claim the stud or fastener provided with the removable head constructed and applied substantially as and for the purpose set forth.

Second, The slotted shank in combination with the removable head, substantially as and for the purpose described.

Third, The head, c, and flanges or disks, b b', provided with points for the purpose of preventing the turning of the fastener as described.

Fourth, The neck de provided with the eyelet hole, f, whereby it is adapted to be used in connection with the fastener, substantially as described.

65,777.—PRESERVING FLOWERS AND OTHER VEGETABLE FORMS.—Mrs. P. T. Pinnig, New York City.

I claim the employment of a solution of glass, or other liquid silica, substantially as and for the purposes set forth.

I also claim in combination with the above the pulverized glass or silica, all as herein specified.

I also claim inclosing the objects as herein set forth in a vacuum, when they have been thus prepared.

I also claim filling the receiver, in which objects prepared as above set forth are placed with an atmosphere of carbonic acid gas.

I also claim the receiver for containing the carbonic acid gas as herein described, having an elastic or yielding portion, to allow of the expansion of said gas without undue pressure in the chamber of said receiver.

65,778.—HORSE RAKE.—Stephen W. Walker, Anson, Me.

I claim the combination of the frame, e, rods, f, springs, l, and teeth, a, arranged and operating substantially as described.

65,779.—METHOD OF ATTACHING EAVE TROUGHS TO HOUSES.—Wm. R. Wallis, Alliance, Ohio.

I claim the strap, D, when used in combination with the strap, C, and plate, E, with its thumb screw, F, as and for the purpose herein set forth.

65,780.—APPARATUS FOR HARDENING AND TEMPERING WIRE.—James C. Walter, New York City.

First, I claim the combination of the screw, C, with the sliding head, B, and frame, A, substantially as herein set forth for the purpose specified.

Second, The combination of the tension spring, the sliding head and the frame, A, substantially as herein set forth for the purpose specified.

Third, The sliding head constructed with clamping blocks, d, and tightening screws, f, substantially as herein set forth for the purpose specified.

Fourth, The arrangement of the screw, C, tension spring, D, sliding head, B, and frame, A, substantially as herein set forth for the purpose specified.

65,781.—WEATHER STRIP.—Jeremy B. Wardwell, Georgetown, D. C.

I claim the weather strip provided with the spring by which the elastic strip, F, is made to conform to the irregularities of the threshold, as herein described for the purpose specified.

65,782.—MACHINE FOR DRESSING FEATHERS.—A. Washburn and J. N. Van Sickle, Medina, Ohio.

We claim the arrangement of the pipes, C D E M, faucets, G, and perforated pipes, H, substantially as described.

We also claim the arrangement shown in fig. 3, whereby during the rotation of the machine the water of condensation is led into a single pipe, from which it is discharge by faucet, L, substantially as described.

65,783.—BREECH-LOADING FIRE-ARM.—Thomas W. Webley, Birmingham, Eng.

I claim applying a spring to the locking bolt of what is known as the Lefancheux or double-grip action catch of breech-loading fire-arms, so as to cause the gun to be self-locking when closed by forming the barrels home.

65,784.—AIR-HEATING FURNACE.—Geo. W. Wilson, Chelsea, Mass.

I claim the arrangement as well as the combination of the main radiator, E, the fireplace, A, the hollow abutments and the air space between the fireplace and main radiator.

I also claim the combination as well as the arrangement of the auxiliary radiator, G, the main radiator, the fire plate, the air space, F, and the abutments, D D, for supporting the main radiator and conducting smoke into it from the fireplaces.

I also claim the combination as well as the arrangement of the U radiators and the bent pipes, L L, with the fireplace or chamber of combustion, and either or both the radiators arranged as specified.

I also claim the application of the grate to the fireplace by means of the pendulous plates applied to the journals of such grate and to the fireplace, substantially as set forth.

I also claim the combination and arrangement of the scraper, P, and its rod, Q, with the main arched radiator and the front plate, H, as explained.

I also claim the arrangement of air registers with respect to the fireplace, the escape passages thereof, and the front plate, H, the whole being substantially as hereinbefore specified.

RE-ISSUES.

2,641.—RAKES FOR REAPING MACHINE, Adam R. Reese, (assignee of Thomas N. Lupton), Phillipsburg, N. J. Patented Sept. 25, 1865.

First, I claim arranging the automatic rake so as to pursue a path parallel or nearly so to the side of the platform next to the standing grain, thence across the platform parallel or nearly so to the front, and thence towards the rear of the platform, and then returning to the place of beginning continuously.

Second, An automatic rake in combination with an elongating arm or shaft, for carrying or driving it.

Third, An automatic continuously rotating rake on a vertical axis mounted on the platform in combination with a straight finger beam.

Fourth, Attaching the rake head to an extensible arm in such manner as to allow the rake head to follow the contour of the platform in its rotation.

2,642.—CRUCIBLES FOR METALLIC BATHS.—Benjamin S. Stokes, Manchester, N. H. Patented July 25, 1865.

I claim a crucible, having its outer surface protected in whole or in part by a metal jacket or covering, or the equivalent thereof, substantially as set forth.

Also, combining with an inner and an outer crucible, a space or chamber between them, filled with sand or equivalent material, substantially as described.

2,643.—HARVESTER.—Wm. N. Whiteley, (assignee of John S. Troxel), Springfield, Ohio. Patented May 11, 1858. Division A.

First, I claim mounting and operating an overhanging reel for a harvester upon a vibrating yoke or frame pivoted at the the axis of the shaft which drives or communicates motion to the reel, so that the reel may be moved backward or forward, as desired, without materially affecting the length of the band or other driving mechanism, substantially for the purposes set forth.

Second, Pivoting the reel yoke or support at the axis of the shaft, which drives the reel, in combination with the slot, H, or its equivalent, and a clamping device to render the adjustment back and forth quick and easy, and to retain the reel at any point desired, substantially for the purpose set forth.

2,644.—CASTER.—James T. Barnes, Hudson City, N. J. Patented Oct. 30, 1866.

First, I claim the caster constructed as described, having the shank, A, cast directly upon the central portion, B, of the axle between the two wheels as herein set forth for the purpose specified.

Second, The arrangement of the wheels, a a, in combination with the shoulder shank, A, arm, B, with its axle, d d, and the washers, c, and bolt, b, substantially as and for the purpose herein shown and described.

Third, The shank, A, enlarged upon two of its sides, to form a shoulder, f, fitting and turning loosely from the rib, h, upon the inside of the mouth of the socket, C, said socket being sprung open to receive the shank as herein set forth for the purpose specified.

2,645.—VALVE MOTION FOR STEAM ENGINES.—John D. Shepard, Buffalo, N. Y., assignee of Horatio O. Perry. Patented March 25, 1856. Division A.

I claim the valve motion above described as arranged in relation to and in connection with the loosely attached, hollow throated and partially rotating valve, substantially as described and for the purposes herein set forth.

2,646.—VALVE FOR STEAM ENGINES.—John D. Shepard, Buffalo, N. Y., assignee of Horatio O. Perry. Patented March 25, 1856. Division B.

I claim holding the axis of the hollow throated partially cylindrical valve, V T, coincident with the center of the curve of the cylinder face by oscillating it by acting on the duplicate bearings, V1 V2 S1 S2, so that it is at liberty to approach and recede from the cylinder face, substantially as and for the purpose herein specified.

2,647.—MOWING MACHINE.—Peter V. Staats, Raritan, N. J., assignee by mesne assignments of John G. Dunham. Patented Dec. 18, 1860. Division A.

First, I claim the combination, in a moving machine, of a stationary metallic axle with the portion between the bearings of the wheels bent and a crank-shaft, arranged transversely thereto, with the driving gear, arranged on one side of the axle, and the crank and pitman on the other.

Second, The combination, in a hinge-joint mowing machine, of two driving wheels, a main frame located between the wheels, and extending both in front and rear of the main axle with a hinged or limber tongue in front, by which to draw the machine, and a caster wheel to support the back end of the frame.

Third, Connecting a short laterally-projecting finger beam to the inner side of the main frame by a coupling arm in the same vertical plane as the finger beam, and having two parallel joints, transverse to the beam, whereby a short coupling arm can be used, and yet either end of the cutting apparatus be free to rise or fall independent of the other.

Fourth, The combination, in a mowing machine, of two main carrying wheels, a main frame located between the wheels, and a laterally projecting hinged finger beam having two parallel joints in the coupling arm with a brace for drag bar, for the purpose of resisting the backward strain of the finger beam, supported at the upper end by means of the main frame in front of the inside carrying wheel.

Fifth The combination with a short laterally projecting flexible finger beam having two parallel joints in the coupling arm at right angles to the beam of a supporting wheel attached directly to each end of and in rear of the finger beam.

2,648.—MOWING MACHINE.—Peter V. Staats, Raritan, N. J., assignee by mesne assignments of John G. Dunham. Patented Dec. 18, 1860. Division B.

First, I claim the combination with a two-wheeled mowing machine having a laterally projecting cutting apparatus, hinged at its inner or heel end only, of an overhanging reel supported upon a single post

Second, The combination with a two-wheeled mowing machine having a hinged finger beam of an overhanging reel having two ribs or beaters only, whereby I am enabled to fold the finger beam up to the main frame without removing the reel.

DESIGNS.

2,671.—NAPKIN RING.—Francis J. Clamer, Philadelphia, Pa.

2,672.—STEAM FIRE ENGINE.—Benaiah Fitts (assignor to Gould Machine Company), Newark, N. J.

2,673.—PLATES OF A STOVE.—Isaac A. Sheppard, Philadelphia, Pa.

CORRECTION—ISSUED MAY 14, 1867.

64,741.—MELODEON.—Jonas Berger, Knoxville, Ill. (not Tenn.)

I claim, in the construction of an upright melodeon, arranging four swells and springs with the double reed boxes and bellows, and combining these with the double series of levers, as arranged, for operating the swells, substantially in the manner and for the purpose as herein set forth.

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NEW YORK STATE TRIAL OF BREECH-LOADERS.

REPORT OF EXAMINING BOARD.

The trials of breech-loading small arms during the past winter by the Board of Officers detailed by Governor Fenton excited great interest among military men and inventors. The latest improvements and inventions were exhibited to the board, the sessions of which were attended by the Russian, English, Spanish, and Danish officers sent to this country by their respective governments to examine breech-loaders.

Thirty days were occupied in the examination of seventeen arms, of systems adapted to conversion of muzzle-loaders, ten arms not so adapted, and three magazine or repeating guns. The tests were severe, but only such as would fairly represent the contingencies of actual service. A description of each arm is given, and a full record of its endurance under the several tests. The arms are divided into five distinct classes or systems, based upon the attachment and movement of the breech-block, as follows:

FIRST CLASS.—The breech-block hinged to front or rear of receiver, and moving in a plane parallel to the axis of the barrel, in which are included the Allin, Berdan, Hubbell, Joslyn's swing-breech, Lampson, Millbank and Montstorm, all adapted to conversion of muzzle-loaders.

SECOND CLASS.—The breech-block hinged to the left-hand side of receiver, and moving in a plane at right angles to the axis of the barrel, including the Empire No. 1 and the Joslyn's cap, both adapted to conversions.

THIRD CLASS.—The breech-block moving on a pivot at its rear end, and the forward end dropping in the receiver, below the chamber, for insertion of cartridge, including the Roberts, adapted to conversions, and the Peabody, intended for original arms.

FOURTH CLASS.—The breech-block pivoted at its lower front portion, near the front of receiver, and below the level of chamber; revolving in a vertical plane passing through axis of barrel, falling back to open the chamber and forward to close it, including the Miller, Poultney, Remington, and the Robertson and Simpson, all intended for original arms.

FIFTH CLASS.—The breech-block sliding in the receiver, either horizontally or vertically, including the Gray and the Meigs, both adapted to conversions, and the Ballard, National, and Sharps, intended for original arms.

In addition to which classification is the Empire No. 2, having no movable breech-block, the motion being in the barrel.

The magazine guns examined were the Ball's, Gray's, and Spencer's. The board arrives at twelve general conclusions or points, based upon its experiments, which may be briefly stated thus:

1. That arms in classes first and second may be objected to, as having too extensive movement of breech-block; and furthermore that it is an undecided question whether the hinge attachment is sufficiently stable.
2. That breech-blocks hinged as in classes first and second require an independent locking device.
3. That breech blocks hinged as in class second, on the left hand side, are awkward to manipulate.
4. That arms of the third class, having lever above the stock, are objectionable on account of constrained action in operating them.
5. That large sliding surfaces, as generally used in the fifth class, are objectionable on account of the friction, etc.
6. That any movement of the barrel, relative to the stock, is a source of weakness.
7. That extensive lever movement in any arm is objectionable.
8. That the retraction of the empty cartridge-case should be, by a positive motion, independent of springs.
9. That openings through the bottom of the receiver or the chamber are objectionable.
10. That the firing-pin should be strong and preferably in one piece.
11. That in the conversion of guns owned by the State, the reduction of caliber by reinforcement of the barrel is not advisable.
12. That the experiments thus far made are not sufficient to determine the result of the reduction in size of working parts by continued wear in service.

Of the arms presented to and tested by the board, it reports:

I. Of those adapted to conversion of muzzle-loaders, it deems the Allin, the Berdan and the Roberts as superior in all respects to any and all the others. But each of these arms, possessing distinctive features, more or less meritorious in themselves and in their combination, the board recommends a further and more extended competitive trial of these several arms, under such rigid regulations and requirements as the board may establish, to which regulations and requirements the several competitors shall consent and subscribe before entering their arms.

Of the remaining arms adapted to conversions the board would place in order of merit as follows: 4th, Joslyn's cap; 5th, Meigs'; 6th, Gray's; 7th, Millbank's, and 8th, Lampson's.

II. Of original guns not adapted to conversion the board report in order of merit: 1st, Remington's improved; 2d, Peabody's; 3d, Poultney's; 4th, The National; 5th, Robertson and Simpson's; 6th, Sharps; 7th, Ballard's, and 8th, Miller's.

III. In regard to magazine or repeating arms the Board is convinced that for the present their use should be confined to the cavalry service, as an examination of the record shows that single breech loaders are capable of being fired at least as many times per minute as a repeating arm, and are more simple in construction and less liable to derangement. In the cavalry service the proper management of the horse in action may render a repeating arm desirable as relieving the soldier from the embarrassment of loading in critical periods. The limited force of cavalry in the State service renders an immediate decision on this point unimportant, and the board recommends a delay in the selection and purchase of repeating arms, as several new inventions are now being perfected, and will soon be presented for trial and competition.

The board report in favor of "central fire" cartridges, the case to be made of brass and somewhat conical in form. More complete lubrication than is usual is particularly recommended. The Berdan cartridge is favorably mentioned.

The board will commence on July 9th next, the competative trials of systems for conversion of muzzle loading arms into practical breech loaders

Army and Navy Journal.

A New Island in the Pacific.

It is reported that a new island has been discovered in the North Pacific ocean, between 50 deg. west longitude, and 40 deg. 30 min. north latitude, twenty miles long. It is exactly in the track of vessels bound to this port from China and Japan. Fogs and misty weather prevail in that section of the Pacific. It is supposed that many missing vessels have been wrecked there. The discovery is considered of sufficient importance to justify the Government in dispatching a vessel to locate the exact position of the island. A company has been organized in San Francisco to survey the island, and they will send vessels this week to examine and take posession of it.



PATENTS

The First Inquiry that presents itself to one who has made any improvement or discovery is: "Can I obtain a Patent?" A positive answer can only be had by presenting a complete application for a Patent to the Commissioner of Patents. An application consists of a Model, Drawings, Petition, Oath, and full Specification. Various official rules and formalities must also be observed. The efforts of the inventor to do all this business himself are generally without success. After a season of great perplexity and delay, he is usually glad to seek the aid of persons experienced in patent business, and have all the work done over again. The best plan is to solicit proper advice at the beginning.

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